- The security features that were identified by the members, supplier and distributors in their workshop sessions. These are the characteristics of the portal that must be present in order to meet their CTQs.

5
- Additional features that were identified in follow-up review sessions with supply chain coordinator personnel. These are more subtle features that emerged during technical, organizational and authorization discussions.

- Best practices that are frequently employed in system security and access
10   management.

Each functional component will first be described in terms of purpose and general approach. Then details will be provided for each function to specify the capabilities that must be present.

15

Assuming that the supply chain coordinator desires to use existing 3rd party software as much as possible, the traditional approach of specifying inputs, processing and outputs for each function will not be strictly followed here. Rather, the emphasis will be placed on clearly describing the full set of capabilities that will be required to deliver the
20   features needed to meet the CTQs. The details associated with the specifics of inputs, forms, detailed processing and outputs will vary by vendor and the vendor's approach to providing the necessary capabilities. It will be the job of the vendors to provide these details so that the supply chain coordinator can use them to determine the best approach for their requirements.

25

Logon (Authentication)

Function Purpose

30   The logon function represents the first line of security and it validates that a user is authorized to access the portal.

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Function Details

The authentication process begins when a user connects to the portal. At that time they
5   will be prompted for:

- Company ID
- User ID
- Password

10

The user will enter the requested data and it will be encrypted prior to sending it to the
portal logon function. Additionally the password field will be masked when the user
enters it (i.e. it won't print on the screen when the user enters it).

15   Once the user has submitted the information, the logon function will check the portal
access control list to determine if access is permitted to the companyID/userID/password
combination that the user submitted.

Users failing to enter a valid companyID/userID/password combination will be notified
20   of the failure and re-prompted. A userID will be locked out after n failures.

The logon function will provide the following password management capabilities:

- Password disablement after an administrator specified period of inactivity.

25

- New user must provide a new password the first time they logon to the portal.

- Passwords will expire after an administrator specified period of time and the user
  will be required to provide a new one.

30

- Alternate passwords will be provided for lost/forgotten password situations.

150

New passwords will be subjected to minimum security password validation rules. These will include things like minimum/maximum length, percent of characters that must differ, uniqueness, etc.

Once a user has been successfully authenticated the system will:

- Offer an option to the user to change their password

- Show the date and time the user last sign on to the system (detect stolen user ID and password).

- Retrieve the user's profile data that defines what data and functions the user can access and transfer to the policy management function (i.e. portal main menu).

All details associated with the logon session will be written to the audit log.
The system administrator will be notified of user ID lockout. The following table lists User Specified Features.

<u>Table 9</u>

Feature	CTQ Category	Explanation
Lockout user after n unsuccessful logon attempts	Security, Prevention	
Notify administrator of lockouts	Security, Prevention	This is a proactive notification that occurs via email, pager, etc. when the attempt occurs
On line monitoring	Security, Prevention	This includes administrator notification of lockout and

151

Feature	CTQ Category	Explanation
		could be expanded to include other threats or situations.
Provide alternate passwords for lost/forgotten password situations	Flexibility	
Password expiration; require periodic password changes	Security, Prevention	
Acceptable password length parameters	Security	
Ability to assign/select password	Security	User can specify their password and change it any time.
Ability to transfer logon intelligence.	Simplicity	The ability to transfer the user profile information that specifies what data and applications they can access is helpful for supporting a single sign on capability for the portal.
Record all activities to the audit log	Security, Prevention, Reporting	This was not an explicitly stated feature. However, it will be required to support the reporting features that were requested by the users.

Community Management

The community management capability allows administrators to manage the user

5   activities within the portal. Specifically it provides the capabilities to add, change and

delete users, and to manage what the user can see and what functions they can perform.

Community management can be covered in four sections:

152

- *Community/Domain Wide Administration*

  Describes the supply chain coordinator system wide administrative capabilities that will be required to establish the community and the entities that make it up (i.e. members, suppliers, distributors and supply chain coordinator).

- *Basic Delegated Community Management*

  Describes the capabilities that will be needed to achieve the CTQs. Many of the capabilities that are found in this basic model can be accommodated by 3rd party software. Some custom programming will likely be required to manage authorization within the complex organizational structures found at the supply chain coordinator.

- *Group Hierarchical Management*

  Describes the use of hierarchies to manage access. This will achieve many of the simplicity and flexibility related CTQs that were not meet by the basic model. It will likely require custom development.

- *Data Publication*

  Describes a capability that is need to support situations such as joint ownership of stores and corporate board committees. It will enable the owner of a group to permit user in other groups to access data in the owner's group. This will be largely custom development.

Community/Domain Wide Administration

Function Purpose

There are certain capabilities that affect the entire community or all of the occupants of a domain (members, suppliers, distributors and supply chain coordinator). These are limited to a single system wide administrator and potentially to domain administrators.

5   Function Details

Community and domain wide administration will include the following capabilities:

- *Community wide administration*
    - o Add/change or delete a domain.
10 - o Delegate domain administration to a domain administrator.

- *Domain administration*

    Domains are comprised of organizations (e.g. members). Organizations are made
15 up of data related entities (retailers, distribution center, plants, etc.). The domain administrator needs the following capabilities to create and manage organizations that make up their domain.

    - o Add, change and delete data related entities (e.g. retailers).
20 - o Link data related entities together (e.g. retailers) into an organization (e.g. member).
    - o Create an organization administrator and delegate the administration of their organization to them.

25 *Basic Delegated Community Management*

Function Purpose

The purpose of community management is to provide a sub administrator with the ability
30 to control what their users can view and what tasks they can perform.

154

An administrator who has been granted administrative privileges for the sub domain that represents their organization performs community management (e.g. a member's retail outlets make up the member's sub domain).

5   The basic model provides the administrator with tools that are used to manage a user's access (view and tasks). These tools include:

  o Groups to specify span of control.

10 o Privileges to specify tasks.

  o Roles to specify a set of privileges that are associated with a function (e.g. retail outlet manager).

15 Community management then provides the administrator with the ability to add, change and delete users.

Lastly it enables the administrator to control user's view and access rights by associating them with a group of data related entities (e.g. retailer) to specify what the user can see 20 and with a role or specific privileges to specify what tasks the user can perform.

Figure **74** is a flow diagram showing how group and roles manage access. User ABC **7402** is associated with Group 2 and is assign a manager role. This entitles ABC to order F and P and view forecasts for retail outlets 1 and 2.
25

Function Details

Functional details will be covered in the context of groups, roles and users.

30 Group Management

As stated earlier, a group is an organizational entity that is made up of one or more data related entities. The retail outlets owned by a franchisee comprise a member group. Groups serve to specify a user's span of control when they are associated with a user.

5 An administrator who has been authorized to manage groups can create new groups, and change and delete existing groups.

New groups:

10
- Requires an ID that is unique in the administrator's span of control.
- Requires a descriptive name.
- Entities (e.g. retailers) that are placed in the new group must exist within the administrator's span of control.

15 In order to change or delete a group, it must exist in the administrator's span of control. Entities being added to an existing group (change) must exist in the administrators span of control.

Role Management

20 A role is a functional entity that is made up of tasks the function is permitted to perform. A restaurant manager is a role that is permitted (i.e. given a privilege) to perform the tasks of ordering food and packaging, and viewing forecasts.

An administrator who has been authorized to manage roles can create new roles, and
25 change and delete existing ones.

An administrator must possess any privilege they assign to a role.

New roles:

30
- Requires an ID that is unique in the administrators span of control.

156

- Requires a descriptive name

In order to change or delete a role, it must exist in the administrator's span of control.

5   Privileges can be specified as default or optional when they are assigned to a role. Default privileges are automatically given to a user when they are assigned to a role. The administrator must explicitly specify each optional privilege (yes/no) for a user when they are assigned a role.

10   A role may be assigned to a group as well as to a user. When it is associated with a group, users receive the privileges specified by the role when they are associated with the group.

User Management

A user is an individual who is authorized to perform some set of tasks on behalf of a

15   group (e.g. a set of retail outlets).

An administrator who has been authorized to manage users can create new users, and change and delete existing ones.

20   A company ID, a user ID and a password identify a user. The administrator cannot view the user password.

New users:

25
- Require a user ID that is unique in the sub domain (e.g. unique within a member organization).
- Require an email address.
- Require a descriptive information such as name and address name.
- The system will assign the password to a new user and inform them of it via

30   email.

User span of control:

- The administrator specifies a user's span of control by associating the user with a group(s) that represent the desired span of control.
- The administrator can associate (add) and disassociate (remove) users with groups.
- In order modify a user's span of control, the user must exist within the administrator's span of control.
- In order associate a user with a group, the group must exist within the administrator's span of control.

User/group application access:

- The administrator specifies the application a user/group can perform by assigning roles/privileges to the user/group.
- The administrator can add and remove roles/privileges from users/ groups.
- In order assign a role to a user/group, the role must exist within the administrator's span of control.
- In order modify a user roles/privileges, the user must exist within the administrator's span of control.
- An administrator must possess any privilege they assign to a user/group.
- If a role is being assigned to a user/group, and if the role has optional privileges, the administrator will be shown the optional privileges and allowed to remove ones that they don't want to grant to the user.

Other

All details associated with community management activities will be written to the audit log.

A capability to link community management with the supply chain coordinator's member management system is required to eliminate duplicate data entry and keep the two systems synchronized.

5   A batch bulk load capability is required to enable user to export data from existing systems to set up their organization in the portal community.

Table 10

Feature	CTQ Category	Explanation
Distributed community administration	Flexibility	Users need to be able to manage their users and their access within the portal. They don't want to be dependent on the supply chain coordinator.
Ability to add, change and delete users.	Security, Flexibility	
Ability to assign access to users	Security, Flexibility	Specify span of control and privileges
Ability to create roles or level of users	Simplicity, Flexibility	
Ability to set up default levels of access	Simplicity, Flexibility	
Ability to clone and/or access rights	Simplicity, Flexibility	
Mass delete of users	Simplicity, Flexibility	Not provided as a part of community management.

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Ability to copy a user ID	Simplicity, Flexibility	Provide to extent that a user's access attributes can be easily specified through groups and roles
Ability to export user load information from member backend.	Cost	Large member would like to use existing data to establish/maintain their organization in the portal.
User can be associated with multiple groups.	Flexibility	District manager A is a backup for district manager B. As a result, A will need to perform ordering district A and B and will need to be associated with both groups. Feature will also be required to support organizations such as finance who will need to view the data of several groups.

Hierarchy

Function Purpose

5

The basic community model that was outlined in the previous section supported authorization and access management for a flat single level organization. Although this can be adapted to support a multi-level organization, it falls short on the CTQs related to simplicity and flexibility. Specifically, the administrator must create groups to correspond

10   to each span of control. This results in a single entity having to be included in several groups. For example, a single retailer may be included in a district, region and a corporate group. Administration in a scenario like this is complex and labor intensive. It becomes particularly cumbersome and error prone because things like an organization change (e.g.

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new retail outlet) requires the modification of several groups (i.e. add it to district, region and corporate group).

A hierarchy provides a superior way to manage span of control and access. The hierarchy defines a company's organization. A user's span of control is set by associating them to the node of the hierarchy that corresponds to their position in the company. This association authorizes them to view the data associated with any entity that belong to the node to which they are assigned. In the case of a new retail outlet, assigning it to a manager also places it in the span of control of the manager's district and region mangers and the corporate CEO.

Hierarchies can also simplify the specification of user privileges by associating them to a hierarchy.

Although hierarchies introduce technical complexity, they greatly simplify administration in large and complex organizations.

The following outlines the requirement details associated with hierarchies.

Function Details

A hierarchy is made up of nodes where a node represents a business function (e.g. retail outlet manager, district manager, etc.). The bottom nodes of a hierarchy are associated with a data related entity (e.g. retail outlet is associated with a manager node/function). They are then grouped under nodes at successively higher levels (e.g. districts, regions, etc.). The top of the hierarchy is a single node (e.g. corporate). In a hierarchy an entity (e.g. retail outlet) will appear in the span of control of each successive parent node.

The following administrative capabilities are required to manage authorization and access with hierarchies.

Hierarchy Management

- Add a node

  Specify a parent node in a hierarchy and add a node beneath it.

5
- Delete a node

  Specify a node in a hierarchy and delete it. This also results in the deletion of any dependent nodes reporting to the node that was deleted.

- Move a node

10
  Specify a node in a hierarchy and move it and its dependents to another node (drag and drop).

- Associate a data entity with a node

  Specify a node in a hierarchy and associate a data related entity to it (e.g. retailer)

15
  with it. In this situation, no nodes can exist beneath the node specified. Also the data related entity must exist in the administrator's span of control.

- Disassociate a data entity with a node

  Specify a data related entity in a hierarchy structure and delete it from it parent

20
  node.

- Move a data entity from one node to another

  Specify a data related entity in a hierarchy structure and move it from its present parent node to a new parent node (drag and drop).

25

User Span of Control Management

Span of control relates to the data a user can view. Under a hierarchy, associating a user to a node in a hierarchy specifies their span of control. This association entitles the user to view the data associated with any entity that is found in the user's node group.

30

User Access Management

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Access management relates to the functions a user can perform. It is controlled by privileges and roles that are assigned to a user (groups of privileges). Under a hierarchy, roles and privileges can be associated to a node. Any user who is then associated to the node receives the privileges that accompany it. See the table below.

5

Table 11

Feature	CTQ Category	Explanation
Ability to publish rights and privileges across hierarchies.	Simplicity, Flexibility	
Ability to authorize multiple levels of a hierarchy	Simplicity, Flexibility	
Ability to manage access against hierarchies	Simplicity, Flexibility	
Flexible data access and management.	Simplicity, Flexibility	

Data Publication

10

Function Purpose

Portal data (e.g. a retailer) is owned by one and only one sub domain entity (e.g. member). The ability to view and process that data is restricted to users and groups who

15   inhabit the entity's sub domain and who have been authorized to do so by its administrator.

However, there are several business situations where an organization needs to view and process data that is owned by another organization that may or may not belong to the

20   same domain. Some common examples are:

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- Two members share ownership of a retailer. As a result both members need to view information about the jointly held retail outlets and order supplies for them.

- Members belong to the supply chain coordinator board or corporate committees. In order to participate in these roles the members need to view and potentially access data in the supply chain coordinator's domain.

The data publication capability is a mechanism for the owners (e.g. member A) of an entity (e.g. retailer 123) to permit a users in another organization (e.g. member B) to view and access the entity's (i.e. retailer 123) data.

Function Details

Data publication is an administrative privilege. It is used by a data owner's administrator to setup a relationship with another party in the portal that will allow that party to view and access data entities (e.g. retailers) that are found the owner's sub domain.

The data publication function will possess the following capabilities.

- The administrator can add, change or delete a data publication relationship.

- Any data entity that is published must exist in the administrator span of control.

- The following elements will be provided to specify a data publication relationship.

  o The span of control (view) that is associated with a data publication. The span of control may be specified as an individual entity (e.g. a retailer), a group (e.g. a district) or a hierarchical node (if a hierarchy feature is provided).

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o Privileges or functions the receiver can perform with the published data.

o The domain (i.e. member, supplier, distributor, supply chain coordinator) and sub-domain ID (company ID) of the organization to which the data is being published.

o The group or node ID in the receiving organization that the published data will be associated with.

o The user ID of the person in the receiving organization who will own the data. This person will control the user views and access (privileges) associated with the published data in their organization.

• All details associated with creating or modifying a data publication relationship will be written to the audit log.

The following table sets forth User Specified Features:

Table 12

Feature	CTQ Category	Explanation
User can view or access data in another sub-domain in their domain.	Simplicity Flexibility	Joint ownership of retail outlets by distinct members.
User can view or access data in different domain.	Simplicity Flexibility	Support board of directors and committees that require members to view and access supply chain coordinator corporate data.

Policy Enforcement

Function Purpose

The policy enforcement function is a centralized capability that manages access to all of the applications that comprise the portal.

Policies specify the access requirements for each application that makes up the portal. The policy enforcement function determines if a requesting user meets the access requirements for an application. The user is granted access by the policy enforcement function if they meet they requirements specified by the policy.

Function Details

A central administrative capability is required to maintain the policies that are used to manage access to the portal's applications.

The details associated with policy enforcement are as follows:

- When a user successfully logs on to the system by providing a valid user ID and password, their span of control and application privileges are retrieved.

- The user is presented with main menu for the portal.

- The user requests a function from the menu.

- The policy enforcement function retrieves the access policies for the requested application from the central policy repository.

- The user's span of control and application privileges are evaluated against the application's policies.

- If the user satisfies the requirements specified by the policy, access is granted.

- If the user does not satisfy the requirements specified by the policy, access is denied.

- Details associated with an access request are recorded in the central audit log.

- The policy enforcement function is responsible for interfacing with the portal applications and passing them information about the user that they require.

The following table sets forth User Specified Features.

Table 13

Feature	CTQ Category	Explanation
Single sign on	Simplicity	After signing on to the portal, the user can access all applications that make up the portal.
Ability to integrate with affiliates (i.e. other 3rd applications that make up the portal).	Simplicity Integration Cost	Provide the affiliate application with the user information it requires to function. Prevent redundant data entry, redundant security, etc.
Ability to interface with other applications: supply chain coordinator 3rd party Remote hosts	Simplicity Integration Cost	The supply chain coordinator wants to use 3rd parties and application service providers (ASPs) for their portal applications. The policy

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Feature	CTQ Category	Explanation
Platform independent		enforcement manager must be capable of interfacing with a variety of platforms in a variety of situations.
Centralized policy management	Simplicity Integration Cost	Don't want redundant application access permission management.

Reporting

Function Purpose

The portal must provide its administrators with two forms of reporting:

- Community management reports.
- An event reporting capabilities that provides the administrator with the data and tools for researching issues, problems, potential breaches, etc.

Functional Details

The functional details of reporting will be covered from the perspective of report type.

Community Management Reports

Community management reports provide administrators with the information they need to manage their users, groups, roles and hierarchies (if implemented).

Reports will likely include:

- User information report showing things such as:

- Basic user information (name, address, telephone number, etc.)
- User span of control
- Roles/privileges
- Usage data (date of last logon, number of logons, total logon time, average logon time, etc.)
- User lockout

- Group reports showing thing such as:

  - The entities (e.g. retailers) that make up a group.
  - Role associated with a group.
  - Users associated with a group.

- Role reports showing things such as:

  - Default and optional privileges associated with each role.
  - Groups associated with each role.
  - Users assigned to each role.
  - Users assigned to each available privilege.

Report content will be limited by the administrator's span of control.

Query and filter capabilities will be required to specify report type and content (e.g. a specific group, a range of users, all roles, user usage details for date range, etc.).

Event Reporting

An event is a system activity that is written to the audit log. Examples of events include connection to the portal, logon attempt, application access requests, add a new user, system errors, etc. Information will accompany an events that identifies it, identifies the user that initiated it, the date and time the event was initiated, status (success/failure), etc.

Events are recorded so that the details associated with them are available to research problems, security breach attempts, etc.

An alert capability is required to specify administrator notification (email, page, etc.) in
5 the case of certain events (e.g. attempted breach, a portal application is unavailable, etc.).

Because event reports from the audit log are run in response to problems or issues, good filtering capabilities will be required to eliminate unneeded data and provide the administrator with only the information they are seeking. Filters should include user(s),
10 event, and date and time.

The following table sets forth User Specified Features.

Table 14

15

Feature	CTQ Category	Explanation
The following community management reports were identified: Master user list Click and view access list User with published data authorization (i.e. users in other domains or sub-domains. Usage reports	Security Reporting Prevention	
Lockout notification	Security	
Online monitoring capability	Security Reporting Prevention	
View audit log	Security	

Feature	CTQ Category	Explanation
	Reporting Prevention	
Parameter driven reports	Simplicity	

Technology

5 **Component and Actor definition of the supply chain coordinator web portal**

As detailed in the previous section, the supply chain coordinator's portal may allow access to supply chain applications. The nature of the applications require a feature and function set; this engagement collected CTQs and functions from the community and

10 organized them along categories.

This section places a slightly different view of requirements on the portal. There may be a public site and a private site (secured access); there may also be applications behind the portal provided by 3rd party application service providers that fall under the private site.

15 There may be administration pages to setup authentication and authorization policies. It is also a requirement that the portal support communications between the supply chain coordinator and the community and between community members.

System View Components

20

Some functional components that may comprise the Portal:

- PVC: Public View Component
- SVC: Secure View Component
25 - AC: Administrative Component
- CUC: Contact Us Component

A more detailed description of each of these components is stated in the following sections.

5 <u>Public View Component</u>

The Public View Component describes the functionality that is available to users of the public web pages on the supply chain coordinator portal.

10 <u>Secure View Component</u>

The Secure View Component describes the functionality that is available to users once they have logged onto the private pages of the supply chain coordinator portal. The private pages include access to the Applications and other functionality.

15

<u>Administrative Component</u>

The Administrative Component describes the functionality that allows users to access administrative links available to Company Administrators and individual Users.

20 Additionally, the component contains information required for users to log on and request passwords.

<u>Contact Us Component</u>

25 The Contact Us Component describes the functionality and information that is available to users on both the public and private pages of the supply chain coordinator. This information consists of service-related questions and other areas of concern for community members.

30 **Actor Definition**

An actor is a user that plays a role with respect to the system. It is someone or something outside the application that interacts with the supply chain coordinator portal. The defined use cases and their definitions are specified below.

5   The systems 'Actors' are the different types of people involved in the business process. Earlier, several types of users are defined for each customer type (supply chain coordinator member, supply chain coordinator, supplier, distributor, retail outlet manager). While those are separate organizations, the actors in each share qualities at this high level of definition. The actors for the supply chain coordinator exchange portal

10 are:

- Company Administrator (Tier 1 Registered User; Access to public and private pages)
- Exchange User (Tier 2 Registered User; Access to public and private pages)
15 - Non-Registered User (Tier 3; Access to public pages only)
- Content Manager (CM, Internal GXS/RM User who has permissions to submit updated content; Access to public and private pages)
- Internal Administrator (Internal GXS/RM User who has permissions to run reports validate the registration status of potential customers; Access to public and
20 private pages)

Actor Details

Company Administrator; (Tier 1 Registered User; Access to public and private pages)

25

Description: A *Registered User (Tier 1)* is a registered community member who has Company Administrator responsibilities for their account.

Computer skills: Computer skill can vary, but a general knowledge of the Web is
30 assumed.

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Business Knowledge: Knowledge of products and services related to the supply chain coordinator suite of applications. This User may be responsible for setting up roles/responsibilities/permissions for Tier 2 Users in the account and company.

5   Exchange Level User; (Tier 2 Registered User; Access to public and private pages)

Description: A *Registered User (Tier 2)* is a registered user who has the second level of privileges. Tier 2 Users may use applications for which they are registered, but they may not sign up for additional applications without approval from their Tier 1 User.

10

Computer Skills: Computer skill can vary, but a general knowledge of the Web is assumed.

Business Knowledge: Knowledge of products and services related to a solutions suite of applications.

15

Non-Registered User; (Tier 3; Access to public pages only)

20

Description: A Non-*Registered User (Tier 3)* has access to the public pages of the supply chain coordinator. They may be able to register via their company administrator, (if the company has registered) or they may be able to register via the automated registration process (an option described in the upcoming sections). Until they are

25   registered, Tier 3 users may not have any level of access to the private pages of the supply chain coordinator.

Computer Skills: Computer skill can vary, but a general knowledge of the Web is assumed.

30   Business Knowledge: Knowledge of products and services related to the solutions suite of applications.

Content Manager

Description: A *CM* is a Content Manager who has been authorized to add/update content
5   to the portal, pertaining to the particular products they own.

Computer skills: Computer skill can vary, but a general knowledge of the Web is
assumed.
Business Knowledge: Knowledge of products and services related to the solutions suite
10   of applications.

Internal Administrator

Description: An Internal Administrator is a registered user who has been authorized to
15   access certain report generation functionality on the private pages of the supply chain
coordinator. They may be the only users allowed to view certain links related to report
generation (Similar to Content Managers and the Upload Content Link).

Computer skills: Computer skill can vary, but a general knowledge of the Web is
20   assumed.
Business Knowledge: Should be at the RailMarketplace.com, Inc. or GXS executive or
marketing level, interested in site usage and feedback for further enhancements.

Portal Components and Requirement Index
25

The following section is an attempt to outline the requirements expressed by
stakeholders/subject matter experts (SMEs) associated with the supply chain coordinator
portal. These requirements revolve around the feature/function lists collected in meetings
with the supply chain community as addressed in the previous sections. This list should
30   be considered proposed at this point and based on GE's interpretation of the features
collected. IT may be finalized through prioritization and solution decisions. It may be

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further refined by the design process that the organization chosen to deliver this solution must complete during implementation.

A listing of these component areas along with their index key is provided below. Table 15 provides a listing of functional requirements so that they can be easily found.

Index Key

PVC: Public View Component

SVC: Secure View Component

AC: Administrative Component

CUC: Contact Us Component

Table 15

Req. ID	Requirement Name	Included in Approach
Public View Component		
UC-PVC.01	View Public Site	
UC-PVC.02	View supply chain coordinator press releases	
UC-PVC.03	View Service Info	
UC-PVC.04	View Media Coverage/Latest News	
UC-PVC.05	Request to Register	
UC-PVC.06	View Legal Pages (Extends from PVC.06)	
UC-PVC.07	View About Us	
UC-PVC.08	View Site Map	
UC-PVC.09	View FAQ's	
UC-PVC.10	Submit Feedback	
Secure View Component		
UC-SVC.01	View Secure Welcome Page	

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UC-SVC.02	Select Application	
UC-SVC.03	Launch Application	
UC-SVC.04	View Application Request Form	
UC-SVC.05	Submit Application Request Form	
UC-SVC.07	View "Community Directory"	
UC-SVC.08	Search "Community Directory"	
UC-SVC.09	Community Directory- New User Listing	
UC-SVC.10	Submit Feedback	
UC-SVC.11	Submit User Survey	
UC-SVC.12	Register for Training	
UC-SVC.13	Quit Private Pages	
UC-SVC.14	View Press Releases	
UC-SVC.15	View Service Info	
UC-SVC.16	View Media Coverage/Latest News	
UC-SVC.17	View Site Map	
UC-SVC.18	View FAQ's	
Administrative Component		
UC-AC.01	Login	
UC-AC.02	Submit "Password" Reminder Request	
UC-AC.03	Re-set Password	
UC-AC.04	Submit "Administration" Change Request	
UC-AC.05	Add Content	
UC-AC.06	Submit "User Information" Change Request	
UC-AC.07	Generate User Report	
UC-AC.08	Generate Site Activity Report	
UC-AC.09	Clone User	
UC-AC.10	Mass Delete of Users	
UC-AC.11	Create and Manage Hierarchies	
UC-AC.12	Manages Access Rights Relative to Hierarchies	
UC-AC.13	Grant Privilege to Another User	

UC-AC.14	View Master User List	
UC-AC.15	View Access List	
UC-AC.16	View Users Who Can Access My Company's Data	
Contact Support Component		
UC-CUC.01	Submit Tech Support Feedback	
UC-CUC.02	View Tech Support Main Page	
UC-CUC.02	Access Email ASP	
UC-CUC.04	Submit Press Analyst Questions	
UC-CUC.05	View Business Development	
UC-CUC.06	Submit Billing Questions	
UC-CUC.07	Submit Accounts Payable Questions	
UC-CUC.08	Verify Account Information	
UC-CUC.09	Submit "Other" Questions	

Technology Options

5   Now that the features have been defined and categorized, and the portal components and actors are known, technology must be selected to address high priority items such as integrating affiliate sites, central policy management, and distributed user administration. Considerations for this selection may include the following IT strategy drivers:

10   Integrating existing and new security systems

- Integrating existing applications with new Web-based applications
- Providing a seamless integration between portal and affiliate sites
- Delegated and single-point administration

15   - Centralized security management
- Scalability of the integrated security systems

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This list of general drivers matches up well to the feature list as collected:

- Distributed User Administration
- Administrative Audit Trail
5   - Access Management
- Logon/Password Management
- Reporting
- Policy Enforcement
- Data Management

10

Security is a major concern, as web sites may contain proprietary business information such as news, data/information, and procurement systems. Without adequate security, opportunities are presented for inappropriate dissemination of proprietary information, sabotage, and other mischievous acts.

15

Comprehensive Security for the supply chain community breaks down into three areas: Web, Network, and Security. Each of the features extends across all three areas, as the following chart illustrates.

20

Figure **75** is a schematic illustrating features **7502** and functions **7504** across web **7506**, network **7508** and system areas **7510.** Each area is very important to a strong security policy that may allow the supply chain coordinator to operate in a real-time integrated supply chain mode, but community management at the web layer was the main focus of

25 this engagement and where most of the options and decisions need to be made.

Technically, from the web portal view, there are two main approaches to meeting the CTQs of the supply chain communities. The first option is for the supply chain coordinator to use its existing NT infrastructure. The second option involves purchasing

30 a portal management solution to abstract user management from applications.

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- Using the existing NT infrastructure

- Using the basic functionality of the portal management solution with minimal
  configuration

5

If option 2 is selected, there are two additional levels of implementation that are additive
to option 2. These may be overall options 3 and 4:

3. Further development within the portal management solution to add additional
10   features

4. In addition to extension of the portal management solution, creating custom
   developed community administration features in a relational database that are
   matched to the portal directory structure

15

There is a choice to be made between approach 1 and 2. Approaches 2 through 4 build
on each other, with approach 4 including all the functionality of choices 2 and 3 as well.
Within choice 2, 3, and 4, there are also sub-decisions to make about products or level of
customization. Table 16 illustrates chart comparing options and product/customization
20   levels.

Table 16

Option 1	Option 2	Option 3	Option 4
Use current NT security solution	Netegrity or Securant Security Management Solution Software	Security Management Solution Software + Custom Administration	Security Management Solution Software + Custom Administration + Advanced Community

			Structure

The technology portion of this report may provide a section on each approach. The technical architecture for each may be detailed, as well as decisions that can be made by the supply chain coordinator within each. Each section may then compare the

5   functionality pieces outlined in the section entitled **Fundamental Requirements** to that provided by the approach being described. Finally, costs and level of effort for each approach may be included at the end of each section.

After each web portal approach is documented, sections on network and application

10   development recommendations may also be included.

Option 1: Using Internal NT Security

Solution Overview

15

The supply chain coordinator already manages Windows NT user accounts for all the employees of the supply chain coordinator. This is to control access to internal business applications. The IT team has the ability to create and delete users, assign user groups, and assign privileges to either the individual user or the user group. Access Control Lists

20   manage the resources each user or user group can access, as well as the level of access such as Read, Write, or Execute. These are some of the same functional requirements for the integrated supply chain portal.

Moving to Internet based systems in the NT environment, most applications developed

25   using Microsoft languages and methods run with Microsoft IIS as the webserver. IIS has authentication functionality included. IIS also provides a authorization features as well such as Read and Write, and since IIS runs as a service on top of Windows NT, it relies heavily on Windows NT user accounts and the Windows NT File System.

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This is the approach the supply chain coordinator uses for the pilot web portal system. The supply chain coordinator has created an NT domain for the web application to use. The supply chain coordinator is setting up user accounts in this domain, and the web application is validating users against Windows NT.

5

Figure **76** is a schematic diagram **7600** showing a current validation of users on a web portal.

For data access in the current web portal, there is an association of retailers to specific

10 supplier, distributors, or supply chain members. This resides in a supply chain SQL database **7602**. The application itself logs onto the database and queries the requested information, using the user id **7604** as a key to make sure the proper data is retrieved for presentation back to the user.

15 There are ways that the supply chain coordinator could continue this operation to manage the entire community of supply chain users. This would involve centrally administering users and physically adding them to the NT user base. The supply chain coordinator would own validating users and setting up access rights, and would need to communicate frequently with companies (supply chain members, suppliers, distributors) to make sure

20 that user setup was proper.

In order to integrate 3rd party provided applications, custom integration would be required in the link between the supply chain portal and the ASP application. The supply chain could work a transfer of user information in the http headers of linked websites. This

25 would provide for an authentication of the user on the 3rd party site. After the initial transfer, the user would interact with the 3rd party application directly with zero visibility back to the portal. Each 3rd party application would also need to manage users themselves and make sure that their user directories were synchronized with the supply chain coordinator. A way around this is for the third party application to trust that the

30 user being passed is valid and to pass all application-specific data to the application at the

time of the link. This provides an easier administration in this model but a much lower level of security and is not recommended.

Reporting would be handled by the IIS logs. If community members wanted to know
5   what their employees were doing on the supply chain applications, they would need to submit a request to the supply chain coordinator. The supply chain coordinator would then need to manually check their logs and find out what user activities occurred. If a community member wanted to know what activities were performed on a 3rd party hosted application, the supply chain coordinator would then need to contact the 3rd party
10   provider and have them manually search their logs and provide reports back to the supply chain coordinator which could then be shared with the community member.

Comparison to Requested Functions

15   In a previous section, the features requested by the supply chain community were detailed along with the functions those features imply. The following table shows whether functions are provided by this approach along with an explanation. Table 17 illustrates features within option one.

20

<u>Table 17</u>

Feature	Y/N	Explanation
<u>SECURITY</u>		
Lockout user after n unsuccessful logon attempts	Y	Application can be written to lockout after n successful tries
Notify administrator of lockouts	Y	IIS log should capture failed attempt. Application can capture lockout event and write to NT log
On line monitoring		Lockouts are captured in the NT log.
Provide alternate passwords for		

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Feature	Y/N	Explanation
lost/forgotten password situations		
Password expiration; require periodic password changes	Y	This can be configured in NT and added to application with minimal development
Acceptable password length parameters	Y	Included in NT
Ability to assign/select password	Y	The supply chain coordinator would create in IIS
Ability to transfer logon intelligence.	N	Not part of NT; a custom integration effort is required per additional 3rd party application.
Record all activities to the audit log	N	Only activities for applications the supply chain coordinator hosts can be captured.
<u>COMMUNITY</u> <u>MANAGEMENT</u>		
Distributed community administration	N	The supply chain coordinator must manage the community centrally
Ability to add, change and delete users.	Y	The supply chain coordinator would perform centrally
Ability to assign access to users	Y	Access Control Lists could be setup in NT
Ability to create roles or level of users	Y	NT allows user groups. Levels beyond that are not supported.
Ability to set up default levels of access	Y	Read or Write
Ability to clone and/or access rights	Y	NT can be configured to allow this.

Feature	Y/N	Explanation
Mass delete of users		
Ability to copy a user ID	Y	There are workaround to enable this using NT.
Ability to export user load information from member backend.	N	Details would be needed and sent to the supply chain coordinator for a custom load
User can be associated with multiple groups.	N	Here groups refers to corporate organizations, and NT structure makes all users part of the same organization within an NT domain.
Hierarchies	N	NT security does not support complex hierarchical structures.
Ability to publish rights and privileges across hierarchies.	N	No hierarchies.
Ability to authorize multiple levels of a hierarchy	N	No hierarchies
Ability to manage access against hierarchies	N	No hierarchies
Flexible data access and management.	N	NT provides very rigid security structures
DATA PUBLICATION		
User can view or access data in another sub-group in their domain.	N	Data is within a domain.
User can view or access data in different domain.	N	NT has single domain.
POLICY ENFORCEMENT		
Single sign on	N	A workaround for SSO is detailed in the section above, but IIS and NT are

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Feature	Y/N	Explanation
		not SSO products.
Ability to integrate with affiliates (i.e. other 3rd applications that make up the portal).	N	Not supported.
Ability to interface with other applications: the supply chain coordinator 3rd party Remote hosts Platform independent	N	Not supported
Centralized policy management	N	This refers to all policies for multiple applications. NT security manages policies for all applications running on in the NT domain, but not applications outside of it.
REPORTING		
The following community management reports were identified: Master user list Click and view access list User with published data authorization (i.e. users in other domains or sub-domains. Usage reports		The NT admin can view some of these reports, but they would not be available to the general community as this requirement specifies.
Lockout notification	Y	NT admin can see lockout notification.
Online monitoring capability	N	Not available through web. Available to NT admin on admin desktop.
View audit log	Y	Admin can view

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Feature	Y/N	Explanation
Parameter driven reports	N	Not provided to community users.

It is possible to custom develop additional authentication and access control functionality on top of NT-based applications. Code can be written in ASP to provide this additional

5 functionality, which would provide a portion of the functionality included in the products considered for option 2. For the purpose of this study, however, it is assumed that the cost of such development would greater than the cost of option 2, purchasing a portal management solution.

10 <u>Costs and Timelines for Option 1</u>

In terms of up front cost, this is the supply chain coordinator's lowest cost alternative. The NT administration features already exist, the supply chain coordinator has skilled NT administrators, and the equipment is already in place. An additional server may be

15 required to handle the number of portal requests once the applications are fully available and ramped.

However, this approach fails on several fronts including application integration and distributed administration. Therefore, the supply chain coordinator would need to

20 manage the community centrally with this alternative. The supply chain coordinator would need many administrators to manage the community with this approach, so that should factor into the ongoing costs of this approach.

<u>Option 2: Implementing a Portal Management Solution</u>

25

Two shortfalls of using the internal NT approach are:

- The supply chain coordinator would only be able to have one set of business rules apply to each user

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- Users would need to be managed centrally.

These shortfalls are especially critical considering the supply chain coordinator is planning to outsource many of the applications behind the portal to ASP providers. In a sense, the supply chain coordinator may become an ASP integrator. With this in mind, a component of a solution is providing a clear method for the supply chain coordinator to deliver ASP model services to members and trading partners with distributed administration.

Extracting User Management From Applications

Option 2 is based on a layer of abstraction between security and the supply chain coordinator's applications. Doing this entails purchasing a security management solution that offers single sign-on and the ability to create a unified directory for users across applications. The benefit of the unified directory is the ability to enable the same user to belong to multiple applications (managed by different community owners) without the need to manage the user as many separate users. For example, the supply chain member could belong to the supply chain board community to access board-related reports. The same user may be a user of a supply chain service application, such as order management. In addition, the supply chain member may be enabled to access collaborative applications such as email. The issue, however, is that each application has its own set of privileges and roles that drive business process.

In a single-entity model, such as option 1, roles are defined and users are assigned privileges and roles. However, the defined privileges and roles are pervasive across all applications that are accessed by that sign-on. Allowing the same user to have a single sign-on with different roles based upon the application community they are interacting with (even the same physical application in two different communities) is not possible. This is possible if the supply chain coordinator chooses to implement a single sign-on infrastructure including a unified directory environment, as the community is separate

from the directory that defines the users. Figure **77** graphically shows how user roles are managed in a multi-community environment **7700**.

The separation of community **7702** and directory **7704** also allows the administration in each community to be different even though the user is shared. Consider the example presented earlier in this section. The supply chain coordinator's IT may control administration for board member reports, while the actual community member controls administration for the order management application. The separation allows changes to a user's profile in one community without impacting the user's existence in another. This is especially useful when adding and removing users. The supply chain coordinator may want to remove a user from the ASP order management service but still have them exist in the board member report application

Single Sign-on Definitions

To discuss single sign-on, central policy management, and delegated administration, it is important to define two terms.

Authentication – First step in single sign-on. Uniquely identify a user based on company id, user id, and password.

Authorization – Occurs after authentication. The level of application of data access allowed for an individual user.

Portal Management Solutions

As the integrated supply chain concept caught on, organizations had to deal with the challenges of single sign-on and distributed administration. These are the same issues the supply chain coordinator is dealing with as they begin their initiatives. The first response of large community owners was to custom build solutions on top of their IIS or Netscape server-based applications, as was suggested as possible in option 1. But as organizations

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began to build custom solutions, there were many failures or limitations on what could be accomplished. At the same time, the market has matured as the need for SSO and distributed organizations expanded to more organizations. Off-the-shelf single sign-on portal management solutions came to market, and many owners of large communities

5   have replaced their homegrown systems with solutions based on these products, which have the following features:

- User entitlement management
- Authentication with single sign-on

10 - Distributed and delegated user administration (group level responsibility)
- Affiliate Services (integrate ASPs)
- Centralized privilege management (one place for all applications)
- User tracking (configurable)
- Ability to link attributes for personalization to single sign-on

15 - Distributed and delegated portal administration
- Integration with most directory services

Web-based Single Sign-on/Portal Management Architecture

20 SSO/Portal Management products are software packages that run on their own server. They also require a directory to operate against. This can be either LDAP or database directories.

The interaction between applications and the SSO/Portal Management server is client-

25 server based, with the application webserver using an agent or plug-in (client) to reference the central policy server for user validation.

Figure **78** illustrates a schematic **7800** showing the protection of resources with a central policy server, a separate user directory, and the integration of affiliate sites **7802** through

30 the agent client **7804**.

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<u>Technologies Supported by SSO Products</u>

Within each area of the architecture, there are multiple methods supported. Solutions can run on multiple operating platforms and with multiple types of user directories. Solutions

5   can be extended with multiple development languages, support many authentication technologies, and operate in conjunction with many network security implementations.

<u>Policy Based Security</u>

10   Figure **79** illustrates a policy based security architecture **7900**, in accordance with one embodiment of the present invention. One of the features of SSO/Portal Management solutions is central policy enforcement for distributed resources. Historically, policies and users were all managed in the same data store as the application being used. In the SSO model, a layer of abstraction exists where administrators manage policies in one

15   repository and users in another. Applications then access the policy server **7902** (which references the policy and user repository) through an agent. The policy server returns an allowed and denied status.

When purchasing an off-the-shelf product, the infrastructure above is part of the solution.

20   The work that must be performed is setup user and policy management, and then to actually create the users and the policies.

<u>Comparison to Requested Functions</u>

25   In a previous section, the features requested by the supply chain coordinator's community were detailed along with the functions those features imply. The following table shows whether functions are provided by this approach along with an explanation. Table 18 illustrates the various features associated with option two.

30   <u>Table 18</u>

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Feature	Y/N	Explanation
SECURITY		
Lockout user after n unsuccessful logon attempts	Y	Supported
Notify administrator of lockouts	Y	Supported
On line monitoring		
Provide alternate passwords for lost/forgotten password situations		
Password expiration; require periodic password changes	Y	Supported
Acceptable password length parameters	Y	Supported
Ability to assign/select password	Y	Supported (not self-registration)
Ability to transfer logon intelligence.	Y	Agent to integrate affiliate sites.
Record all activities to the audit log	Y	Supported
COMMUNITY MANAGEMENT		
Distributed community administration	Y	Basic in this option.
Ability to add, change and delete users.	Y	Supported
Ability to assign access to users	Y	Supported
Ability to create roles or level of users	Y	Supported
Ability to set up default levels of access	Y	Supported
Ability to clone and/or access	Y	Supported with configuration

Feature	Y/N	Explanation
rights		
Mass delete of users		
Ability to copy a user ID		
Ability to export user load information from member backend.	N	Supported, but not implemented
User can be associated with multiple groups.	N	Groups here refers to organizations, which required customization
HIERARCHIES		
Ability to publish rights and privileges across hierarchies.	N	No hierarchies
Ability to authorize multiple levels of a hierarchy	N	No hierarchies
Ability to manage access against hierarchies	N	No hierarchies
Flexible data access and management.	N	SSO out of the box does not deal with application-specific access (data required with an application)
Data Publication	N	Not supported
User can view or access data in another sub-domain in their domain.	N	Not supported
User can view or access data in different domain.	N	Not supported
POLICY ENFORCEMENT		
Single sign on	Y	Supported
Ability to integrate with affiliates (i.e. other 3rd applications that make up the portal).	Y	Supported

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Feature	Y/N	Explanation
Ability to interface with other applications: The supply chain coordinator 3rd party Remote hosts Platform independent	Y	Supported
Centralized policy management	Y	Supported
REPORTING		
The following community management reports were identified: Master user list Click and view access list User with published data authorization (i.e. users in other domains or sub-domains. Usage reports	N	Admin can see some of this data, but it is not enabled to be viewed by users through their own application
Lockout notification	Y	
Online monitoring capability		
View audit log	N	The supply chain coordinator's admin only – not readily available to individual users
Parameter driven reports	N	The supply chain coordinator's admin only – not readily available to individual users

In comparing this chart to the one in the last section outlining option 1, there are many more "Yes" functions. These are in the areas of single sign-on, integration of affiliate

5   sites, distributed user administration, and central policy management. What is not

supported in this approach are hierarchies, publishing privilege rights to other users outside of one's group, managing application specific data in the user profile, and advanced activity reporting made available to individual users.

5   Product Options

There are several companies who provide software and services centered around this approach. These companies include Netegrity, Securant, enCommerce (a division of Entrust), and Oblix. For the supply chain coordinator, GE recommends that Netegrity
10 and Securant be evaluated for the portal management software solution. This is as a result of research conducted for GE Global Exchange Services deployments already in production and implementation experience in the General Electric Company.

There are several differences between the two products in architecture more than
15 function. Netegrity is the market leader and has the most large scale implementations, including providing the base architecture for GE's global supplier portal and several other GXS solutions where the requirements were similar to the supply chain coordinator's. Securant waited longer to go to market, but by many accounts has a better future vision and more elegant architecture. Another significant different is that Netegrity is very
20 focused on development around LDAP, where Securant uses database technology as the base under their directory structures.

In order to compare the two products, data is provided below from Giga Information Group. The following is a list of criteria used by Giga Information Group to evaluate
25 web-based single sign-on products:

Multiple Authentication Types — All SSO products support passwords, of course. But some may support additional authentication types, such as biometrics, digital certificates, tokens or smart cards.
30

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Authentication Method — The method differs from the type by representing the underlying authentication architecture. How well does the product handle the registration, suspension, etc.

5   **Quality of Administration** — In the case of employee SSO, the emphasis is placed on easy-to-use administrative console, intuitive commands and integration with user data repositories already in existence (e.g., human resources databases). Web SSO products are evaluated similarly, with the added point of distributed, subordinate administration — allowing multiple administrators to manage subsets of the user population.

10

Breadth of Supported Applications — How diverse are the supported target applications and platforms?

Granular Access Management — The Administrative console should permit the

15   administrator to control authorization not only to certain applications, but also under certain conditions. Web SSO products are heavily weighed on this point.

Robust Architecture — How fault-tolerant and efficient is the underlying architecture of the product itself? How well does it scale to loads and to geographic distances?

20

Use of Directory Services — To what extent does the product rely on directories, compounded with the ability of that directory to be used for other purposes simultaneously?

25   **End User Ease of Use** — For employee SSO, this refers mainly to the familiar desktop experience and the elimination of normal log-in interruptions. For Web SSO users, this refers to the degree to which the user's desktop browser is modified in any way.

Vision — Also known as product road map, which vendor projects the most visionary

30   use for its products during the next five years?

Costs and Timelines

For option 2 the assumption is that the security management solution software provides single sign-on, authentication management, entitlement management, distributed
5   administration and affiliate services. Table 19 shows list of assumed functionality for the purpose of cost and level of effort estimation:

Table 19

Feature List	Option 2: Netegrity or Securant Security Management Solution Software
Distributed User Administration	Option 1 plus user registration service with the following directories technology: Netscape LDAP, NT Domains, Novell Directory Services, SQL Database, Oracle Internet Directory
Administrative Audit Trail	Basic User/Session/Application tracking
Access Management	Web interface to administer authorization and access control, secure portal management
Logon/Password Management	Basic authentication schemes, X.509, tokens, Forms, RADIUS, certificates and SSL
Reporting	Basic reporting from system/software logs
Policy Enforcement	Centralized basic policy-based management
Data Management	Basic access rules on data

10

Hardware

Once hardware is acquired, the supply chain coordinator may need to host the solution on
15   a dedicated platform. This may require at least two standard server class machines, one for production and one for pre-production/backup. The supply chain coordinator may

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choose to have a third box as a dedicated development and test environment or dedicated backup.

Product Training

5

For all developers who customize and build on the security platform, training may be required. The estimated time for training is a month per applied resource.

Resources

10

The following is an estimated list of resources that may be required to install and configure the security management solution software to provide the functionality in the table above.

15
- 1 project manager
- 1 system integrator
- 1 QA
- 1 security consultant

20 Estimated Project Length

Estimated project length is 2-3 months.

Option 3: Security Management Solution Software + Custom Administration

25 Option 3 addresses many of the delegated and self-administration requirements the supply chain community demands. While the product itself provide the ability to distribute administration features, most of these center around assigning access privileges for applications or resources. It does not take into account distributed administration of user specific data (preferences and data attributes) that may be required by the

30 applications behind the supply chain portal. The basic product also does not capture and

consolidate events from multiple applications and make them available for viewing by individual users and group administrators.

Figure **80** is a flowchart of a process **8030** for a secure supply chain management framework. A plurality of users including suppliers, distributors, and stores of a supply chain are registered utilizing a network in operation **8032**. The registered users are maintained on a list in operation **8034**. Data from a plurality of stores of the supply chain is collected utilizing the network in operation **8036**. The list is updated to add, edit, and delete the users utilizing the network in operation **8038**. When a request (which includes an identifier) for access to the data is received utilizing the network in operation **8040**, the identifier is compared against the list in operation **8042** and a network-based interface is displayed in operation **8044** for allowing access to the data upon the successful comparison of the identifier against the list.

In one aspect, the identifier includes a password. In another aspect, the data is encrypted. In a further aspect, the list is updated upon receipt of a notice from at least one of the stores. In an additional aspect, only certain data is displayed based on the user being one of the suppliers, distributors, and stores. In one aspect, the network includes the Internet.

Setting Up a Unified Directory

Directory structure may be useful for extending the security management solution. The exact design of the directory may be the first task for an organization implementing the extended functionality for the supply chain coordinator. Directory design is beyond the scope of this engagement, but the following outlines the items to create directory structures that support the supply chain coordinator's needs.

1. Determine the Directory's Goals
2. Plan the Directory Data
3. Identify all data to go into the directory
   - Determined where the data may be mastered

- Determine who manages the data and who exactly may be allowed to update data
- Determine who can use the data and form
- Document the results

5   In identifying data, the question of what should go into the directory should be asked. The answer is data that is read often and written little:

- Data that can be expressed in simple object-attribute-value form
- Data useful for more than one audience
10 - Data accessed from more than one physical location

It is also important to ask what should not go into the directory. The answer is data that changes frequently, Large and unstructured chunks of data designed for file systems, ftp servers, web servers, or relational databases, data that requires sophisticated database 15 operations to be accessed and manipulated.

4. Plan the Directory Schema
- Identify all attributes needed to support a directory
- Identify which attributes should be indexed
20 - Identify all object classes needed to support a directory data
- Determine if and how you may extend the schema
- Document

The questions in planning the schema are how may the data be represented?
25

- What is the authoritative source of each data element
- Who is the owner for each element in the schema
- How is the data element updated in the directory and how often
- How often is the data accessed and in what way
30 - Would indexing the data element be productive for speeding up lookups?

5. Plan the Directory Tree

6. Plan the Security Policies

7. Plan for Replication and Referrals

5   8. Create the Implementation Plan

Extending the Directory to Meet Application Specific Requirements

Adding User Specific Attributes

10

Portal management solutions based on a directory include the ability to create extended
attribute columns in the schema. Extended attributes can serve a number of uses by
applications. Two common examples are user preferences such as language and local
time. Once the directory structure designed by the process above is in place, the supply

15   chain coordinator may need an application to allow users to manage their preferences and
other data to be used by applications.

Figure **81** shows a schematic with attribute setting through a web interface **8100**. The
figure shows an attribute **8102** that can be set through a web interface **8100**. The

20   preferences are saved in the directory attributed **8104** to company_id and user_id **8106**
(which together form a unique user in the system). Another example of attribute data
pertaining to the supply chain applications could be to store single or multiple retailers a
specific user can access data for.

25   For each attribute category the supply chain coordinator decides to include in the
directory store, administration screens may be required to add, modify, or delete the
attribute data.

Advanced User Privileges for Extended Directory Use

30

Once the application functionality specified previously exists, a new community management challenge presents itself. The question of who can access the new administrative features and what attributes they can update must be answered.

5   What makes this challenge much greater than managing privileges in Option 2 is that with the base configuration, privilege models are more simplistic and for the most part reserved for administrator users. Now that application-critical attribute data is being maintained by users themselves in a more distributed model, it may be helpful to make sure that the privileges to access applications and data are distributed properly.

10

At creation time, a user can get the following privileges:

Default privileges (defined by group type, user type and creator privileges, they are the intersection of these three sets of privileges, what is common to all of them).

15

Allowable privileges (creator privileges) These privileges are those, which the creator has, but are not included in the users default privileges.

Default privileges are assigned to the user at creation time (a trigger should be
20   automatically fired), the *allowable* privileges may be granted if the creator choose to. The user privileges can be modified later by a user with sufficient privileges. That modifier user can revoke any privilege, (no matter if he/she has or does not have that privilege) and can grant only the privileges he/she has.

25   The administrative interface needs to be extended to allow for the addition of allowable features. The process by which default privileges may be assigned also needs to be customized in this approach. Once the more sophisticated privileges are in place, the update preference process is enhanced to check for proper access level. Figure **82** illustrates a flow diagram **8200** for assigning default privileges.

30

Once this information is stored and updated in the user profile **8202**, the application needs to update the current session. This requires that the session object be able to handle the attribute information so that it can be passed to applications that need it later (another piece of work).

5

Finally, though outside of the scope of the portal management solution, the applications that may use the extended attribute information must be programmed to correctly receive the information and put in into its application session.

10   Custom Privilege Templates

Another way to extend the security management solution to make administration easier is privilege templates. There should be privilege templates for each domain in the system. These focus on applications a certain type of user can access. For example, certain

15   functions are only for the supply chain ember users. If there are certain things a user type can perform, making the administrator setup these privileges over and over again for each new user is a waste of time. Setting up a template for all users of that domain makes more sense. The domain privilege templates are created and maintained (add / delete privilege) by admin users.

20

Throughout the community there are many users who share a similar job function. Some of these differ within a domain, but some also are the same throughout the system. For example, every group may have an administrator regardless of domain. In order to save time in user setup, a user should be able to be assigned a role type that carries a certain

25   number of privileges with it. The role may be used as a template to setup users, or the role might actually become an entity that privileges are assigned to, and whereby a user inherits those privileges by being attached to the role. Some roles may be setup for use across the system by the system administrator; the domain where the role is used may bound these. Other roles might be setup in a domain or group, depending on how much

30   flexibility the supply chain coordinator decides to include in the solution.

203

The final piece to what a new user can be granted deals with the fact that a user can add only privileges that he/she was granted with, however he/she can delete any privilege that the grantee template contains.

5   Figure **83** shows a Venn diagram **8300** illustrating the intersection of privileges, i.e. domain **8302**, group **8304**, and granted **8306**, for a new user.

There should be a user interface for maintaining the tables where domain and role templates are stored. After a new domain or role is created in the system, a UI page is

10   needed that allows the creator to attach newly created templates of privileges to the new domain or role. The creator can grant only his/her privileges.

Combined Activity Logging and Reporting

15   Another feature the supply chain community asked for was a single place to view the activities their employees perform in supply chain applications. In option 1, this was not possible, as there was not a single view of a user across applications. In option 2, there was single sign-on and the infrastructure to capture some user information across applications, but very little customization performed to take advantage of the

20   infrastructure.

In option 3, two important functions are added. First, development is performed to increase the number of events that are captured about the user. This includes integration to the third party ASP applications to retrieve a set of user initiated events. These events

25   are either stored in the security solution logs or in the supply chain coordinator's database.

The second part of this development effort includes building online visibility to the events captured for a group's administrator. This function gives the distributed

30   community administrators the tracking capabilities they have asked for. These online views and reports should allow a group admin to see activities, both application access

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related and perhaps even user actions within an application (depending on what the third party ASP applications can provide). There was also discussion during the workout sessions that the system might provide visibility for users within a company, with possible views including all registered users from their company.

5

Comparison to Requested Functions

In a previous section, the features requested by the supply chain community were detailed along with the functions those features imply. Table 20 shows whether functions are
10   provided by this approach along with an explanation.

Table 20

Feature	Y/N	Explanation
SECURITY		
Lockout user after n unsuccessful logon attempts	Y	Supported
Notify administrator of lockouts	Y	Supported
On line monitoring		
Provide alternate passwords for lost/forgotten password situations		
Password expiration; require periodic password changes	Y	Supported
Acceptable password length parameters	Y	Supported
Ability to assign/select password	Y	Supported (not self-registration)
Ability to transfer logon intelligence.	Y	Agent to integrate affiliate sites.
Record all activities to the audit log	Y	Supported

Feature	Y/N	Explanation
COMMUNITY MANAGEMENT		
Distributed community administration	Y	Basic in this option.
Ability to add, change and delete users.	Y	Supported
Ability to assign access to users	Y	Supported
Ability to create roles or level of users	Y	Supported
Ability to set up default levels of access	Y	Supported
Ability to clone and/or access rights	Y	Supported with configuration
Mass delete of users		
Ability to copy a user ID		
Ability to export user load information from member backend.	N	Supported, but not implemented
User can be associated with multiple groups.	N	Groups here refers to organizations, which required customization
HIERARCHIES		
Ability to publish rights and privileges across hierarchies.	N	No hierarchies
Ability to authorize multiple levels of a hierarchy	N	No hierarchies
Ability to manage access against hierarchies	N	No hierarchies
Flexible data access and management.	Y	Custom extensions to support application specific data needed to

Feature	Y/N	Explanation
		control data access
DATA PUBLICATION		
User can view or access data in another sub-domain in their domain.	N	Not supported
User can view or access data in different domain.	N	Not supported
POLICY ENFORCEMENT		
Single sign on	Y	Supported
Ability to integrate with affiliates (i.e. other 3rd applications that make up the portal).	Y	Supported
Ability to interface with other applications: the supply chain coordinator 3rd party Remote hosts Platform independent	Y	Supported
Centralized policy management	Y	Supported
REPORTING		
The following community management reports were identified: Master user list Click and view access list User with published data authorization (i.e. users in other domains or sub-domains. Usage reports	Y	Custom

Feature	Y/N	Explanation
Lockout notification	Y	
Online monitoring capability		
View audit log	Y	Custom
Parameter driven reports	Y	Custom

From the comparison chart, this is a pretty comprehensive alternative. Still missing are the most complex community management items such as hierarchies and data publication 5 across domains, but most other items are supported by this alternative.

Costs and Timelines

For option 3, the assumption is that the security management solution software provides 10 more advanced administration features, self-administration, improved session tracking and event capture, detailed reporting, and custom policy extensions. Table 21 shows a list of assumed functionality for the purpose of cost and level of effort estimation.

Table 21

15

Feature List	Option 3: Security Management Solution Software + Custom Administration
Distributed User Administration	Option 2 plus, Custom approve/reject registration, grant/deny access to applications, grant privilege, modify user profiles, reports
Administrative Audit Trail	Custom User/Session/Application tracking
Access Management	Web interface to administer authorization and access control, secure portal management and custom agents.
Logon/Password	Basic authentication schemes, X.509, tokens, Forms, RADIUS,

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Management	certificates and SSL. Custom notification and online monitoring
Reporting	Custom reporting integrated with monitoring systems
Policy Enforcement	Custom extension of the policy
Data Management	Custom extension

Software and Hardware

From a cost standpoint, Option 3 assumes that Option 2 has been implemented.

5   Therefore, additional software license fees are not required. Additional hardware is probably not required, unless the load on the directory requires a separate installation of the supply chain coordinator decides to implement a reverse proxy server.

Resources

10

The following is an estimated list of resources that may be required to install and configure the security management solution software, develop custom administration, and develop custom reports to provide the functionality in the foregoing table.

15   1 project manager

1 business analysis

1 system integrator

2 web/database developers

1 QA, security consultant

20   Estimated Project Length

The estimated project length is 4-6 months (Dependent on completion of option 2)

Option 4: Adding Advanced Community Structures

25   The supply chain coordinator has a very unique community with real-world issues that defy standard organizational definitions. No two organizational structures or ownership

arrangements are the same. Yet being able to map the real world may be useful for fully meeting the community's requirements without clumsy workarounds.

5 The following section describes several custom additions that could be developed to push out community management to end-users and allow them to manage their web-based applications in a way matching their real-world business organization. Also presented is a way to dynamically manage the relationships between supplier, distributors, and retailers in place of a cross-reference method that requires constant update for application data access.

10 Each of the following would be custom developed application. While they would integrate heavily with the portal management solution and directory structure in options 2 and 3, they would be stand alone applications that would run in their own environment.

15 **Creation of Hierarchies for Application and Data Access Control**

Hierarchies are a way of representing real-world structures inside of an application. The purpose is to provide a more flexible way to manage the relationships between entities and other entities, entities and users, and users and data. Hierarchies are very complex to 20 implement, especially in a many to many community such as the supply chain coordinator has. If implemented properly, however, they can provide group owners a way to manage their application and data controls that matches the way they see their own businesses and maps how they control functions in real life. This section attempts to lay out how hierarchies are implemented, maintained, and how they can be used to 25 enhance privilege storage.

Creating and Managing Domains

The first step in creating a hierarchy is to create domains. Domains are the different 30 types of groups that may exist in the portal, with each one requiring different business

rules for privilege assignment. An application function is needed to add a domain or remove a domain as shown below.

5   Figure **84** illustrates a diagram **8400** showing a system **8402**, supply chain member **8404**, retail manager **8406**, the supply chain coordinator **8408**, supplier **8410**, and distributor root nodes **8412**.

Creating and Managing Groups (Corporate Organizations)

10

Once domains exist, the next step is to setup groups within a domain. An example is the supplier domain. There are many different supplier companies, and each of these may have their own group (to control data access rights) even though they all share common application access rights. To technically describe groups under the top level domain, the

15   term node is used. Nodes can be single level in nature or built in n-tiered structures, with each node having a parent node. In the case of a top level group, the parent node is the domain itself. An application function to add/modify/delete child nodes is required to add groups as shown in the diagram below.

20   Figure **85** illustrates another diagram **8500** showing groups **8504** within domains **8502**.

Groups exist within a domain. Therefore no matter what roles are created within a group, they are bounded by the privileges granted to a domain.

25   Adding Users to a sub-group (node) versus to companies

In a directory based security model (LDAP or NT), users typically belong to companies (groups). In the move to n-tiered hierarchies, there is also a move from the directory used by the SSO product to a relational database. This is because referential integrity is

30   required to take full advantage of and properly manage hierarchies. By only allowing top level groups (not allowing an n-tired hierarchy), the hierarchies are easily synched to the

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companies in the directory. If the supply chain coordinator chooses to enable sub-groups, however, users belong to nodes and not companies, and the path to the top node of each hierarchy instance identifies the corresponding company in LDAP. An n-tier hierarchy is shown below.

5

Figure **86** shows still another diagram **8600** showing hierarchies **8602**, in accordance with one embodiment of the present invention.

If n-tiered hierarchies are enabled, the management feature must also allow for nodes to
10   be moved from one parent to another, as well as the ability to take a node and all nodes attached below it and move them together. Figure **87** shows a process **8700** for hierarchy management, in accordance with one embodiment of the present invention.

Figure **87** shows that this is an involved process requiring proper design, custom
15   implementation, and testing.

Hierarchy Linkages for Data Access Control

In the initial stages, all information distributed by the supply chain coordinator to
20   suppliers and distributors may be packaged by the supply chain coordinator. For example, in the pilot, the supply chain coordinator maintains a list of stores served by a specific distributor. When a report runs, it runs for all retailers associated in the cross-reference table to that distributor. To make sure information is correct, those cross-reference tables must be up to date. This approach also means that the supply chain
25   coordinator is in control of what data can be viewed by a distributor, and there are very few controls over who within a distributor organization can view retailer information. The supply chain member has very little control over their data in this scenario, and the supply chain coordinator has a very high management overhead in this data exchange.

30   To perform more complex data access control, the supply chain coordinator may choose to implement linkages between organizational hierarchies. As described below,

hierarchies can be added to each domain (The supply chain coordinator, supplier, distributor, supply chain member, retail manager) to add application access flexibility. For data purposes, there can be links between nodes of one hierarchy and another. The most common usage of this would be a distribution center to a store.

5

Example: Looking at a large supply chain member and a distributor that serves them. A generic structure is shown in Table 22.

Table 22

10

supply chain member	Distributor
Corporate Group	Operating Group
Division	Region
State	Distribution Center
City / Area	Retailers
Retailer	

Figure **88** depicts a hierarchy **8800** in the supply chain portal management, in accordance with one embodiment of the present invention. In the supply chain members hierarchy,

15 all retailers **8802** are attached to a level of node representing metropolitan areas **8804**. From the diagram before, each retailer of a supply chain member is associated with one (and only one) distribution center of a distributor. This allows a supply chain member to allow access for a distributor to access information for all retailers that they serve. But rather than assigning access for each retailer on its own (maintaining a cross-reference),

20 the can leave the access control to the linkages created. This assumes that the linkages are maintained properly, but the advantage is that distributor access could be restricted to a level below the top level node without the need to update the access privilege every time a retailer status changed. The next section describes how this is technically implemented.

25

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Hierarchy linkages for Data Publication

Each point in a hierarchy is a "node". Each node has a number or value assigned to it. This NODE_ID is numeric, unique system-wide and would enable the supply chain
5   coordinator hierarchy system to clearly and unambiguous define in the application any location in the supply chain member, supplier, distributor, or retail outlet manager hierarchy.

Figure **89** illustrates the retail manager **8900** as part of the supply chain coordinator
10   hierarchy **8902**, in accordance with one embodiment of the present invention.

The node ids or attributes become important in privilege setup. For example, initially a user named "Joe" might be part of the group "Restaurants." In a normal association, Joe would be able to see all data that belongs to his group. The access to data could be
15   restricted in option 2 or 3, but that would have to be handled by the applications or through extended attributes with the actual store numbers in the portal management solution. There was not a concept of inherited data access or restricted data access through the use of nodes.

20   Now, assume that Joe is really a field auditor in the west restaurant manager division. As the restaurant manager admin, you want to setup Joe so that he can only access data for the West region, and cannot see the other divisions data. In the database portion of the security management system, the company id (restaurant manager) in the company id is replaced with a group id. Because the group id is a sub-group of the top level restaurant
25   manager node, it can be associated back to the company_id that is stored in the directory.

Because Joe now belongs to group 503 and not group 500, he can only see data for restaurants from his node in the hierarchy and downwards. Note Table 23.

30   Table 23

214

Group Id	User Id	User Type	Priv. Id	Grantor Id	Restricted Node Id
503	Joe	the supply chain member	View Order Data	500	

Another case might be that while Joe works in the West Region, he actually only audits restaurants in the Tempe Metropolitan area. The columns can be added to the privilege to

5   include other information such as a node that further restricts data access. With the privilege below, Joe can now only view order data for restaurants below node 506, even though there are more restaurants under the scope of node 503. Note Table 24.

<div align="center">Table 24</div>

10

Group Id	User Id	User Type	Priv. Id	Grantor Id	Restricted Node Id
503	Joe	supply chain member	View Order Data	500	506

The concept of extending columns in the privilege store becomes very important when on organization has a requirement to grant access to applications and data to users in another

15   group or another domain.

Granting Privileges Across Groups

Introduction

20

The requirement to grant access from one group to a user in another group comes from the complex ownership arrangements that the supply chain members have.

The supply chain members are the owners of the data (retailer information). They can
5 publish (grant) their privileges to users in other organizations. The design for this is that supply chain members publish data in their hierarchy by:

- Granting access to retailers that belongs to their group or to groups downward in their (supply chain member) hierarchy.

10

- Granting access to specific retailers (many retailer ids).

- Granting access to retailers within a state or a zip code.

15 Example:

The grantor that belongs to 345- supply chain member node publishes the privilege to view order data to user Joe belonging to 123 supply chain member node. What Joe can see, so far, are the retailers the granter can see in his hierarchy, "R1", "R2", "R3"and
20 "R4".

The grantor can narrow down the publishing by specifying a node in his hierarchy, let us say node 456. At this point, the user can see data for "R1", "R3" and "R4".

25 A "state" or "zip code" can narrow more the publishing.

Figure **90** is a schematic showing the process **9000** by which cross-domain access rights are granted.

30 Table 25 shows an example of how the privilege would be written to the central policy management.

216

Table 25

Group Id	User Id	User Type	Priv. Id	Grantor Id	Restricted Node Id	Restaurant Id(s)	Attributes (state/zip)
123	Joe	supply chain member	View Order Data	345	456		.

5   Just the node numbers are stored in the directory. When the user is authenticated and accessing applications that need a store list in order to properly enforce data access rules, the custom application written in this alternative must access the hierarchies in the database. From the database, the application translates the intersection of the node ids into a list of valid stores that the user may perform the granted functions. This retailer list

10   is then returned as part of the header strong to the resource requested.

You could even make this more granular by adding attributes for state or zip code associated with the nodes (especially the lowest node, which is a retailer).

15   Publication Functionality

The following is a list of publication functionality from a supply chain member point of view.

20   Publish any privilege a user has (and my data span of control) to users that need to perform actions for my retailers.

Publish all my privileges a user have (and my data span of control) to users that need to perform actions for my retailers (mainly for equal partners).

25

Revoke user publication.

Figure **91** is a diagram **9100** that shows a process flow for an administrative function. A publication can not be modified, it has to be deleted and then publish again. As with other custom developed community management functionality, a management interface to for granting privileges is required.

Publication Business Rules

A supply chain member can grant access to retailers that belong to their group or to groups downward their hierarchy. A user can see only items at retailer level if he/she got "privilege" published " to him/her. The supply chain member nodes and retailer ids should not be mutually exclusive, as a node can be specified but a retailer may also be specified.

Retailer ids and attributes should be mutual exclusive, either one can be specified, but not both. This is because attributes are restrictive, so by default any store specified must also have that attribute as part of it.

Only the grantor can revoke data publication.

The supply chain member does not publish data to users that belong to supplier or distributor hierarchy.

Suppliers or distributors can see data based on the retailers linked to their hierarchy without the supply chain member specifically publishing data (assuming the application permission has been granted to the supplier/distributor domain by the supply chain coordinator). There is no need for a supplier/distributor to see another supplier/distributor hierarchy data.

The supply chain member can publish data to the supply chain member users.

The supply chain members publish data to another supply chain member user only if the user is not in the same hierarchy with the grantor or if the user is in another branch of the hierarchy than the grantor.

5   Historical Requirements for Retailer Linkage

A very complex customization of the directory attributes would be to bound all privileges by start and end dates. The reason behind this optional function is that retailers often change hands. It was expressed in the workout sessions that members may need to view

10   historical data for a specific retailer (from both the supplier/distributor side as well as the supply chain member side) even if they not currently own or serve that retailer. There are also legal requirements that may require this ability. Table 26 illustrates an example of this privilege.

15   Table 26

Group Id	User Id	User Type	Priv. Id	Grantor Id	Restricted Node Id	Retailer Id(s)	Attributes (state/zip)	Start Date	End Date
123	Joe	Supply chain member	View Order Data	345	456			1-1-2000	1-1-2001

As the number of attributes that need to be used by the application or translated into other information such as retailer numbers increases, so does application load. There are

20   significant impacts on application performance and ease of use, as well as maintainability of both the portal management solution and the applications.

Auto associate store information

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Figure **92** is a flowchart of a process **9230** for updating information in a supply chain management framework. A plurality of stores of a supply chain are registered utilizing a network in operation **9232**. The registration includes receiving first identification information. Data is collected from a plurality of stores of the supply chain utilizing the

5   network in operation **9234**. This data relates to the sale of goods by the stores and includes second identification information more recent than the first identification information. Access to the data is allowed utilizing a network-based interface in operation **9236** so that in operation **9238** the first identification information can be compared with the second identification information in order to allow for the updating of

10   the registration of the stores based on the comparison in operation **9240**.

In an aspect, the updating includes updating the first identification information to include the second identification information. In another aspect, the updating includes updating a distributor assigned to the stores based on the comparison. In further aspect, the first

15   information includes a store identification number. In one aspect, the registration is further updated based on the data. In an additional aspect, the network includes the Internet.

The supply chain coordinator receives a load of updated retailer information from the

20   retailer manager. This information is currently batch loaded into the SQL database and updates are made to tables matching retailers to suppliers, distributors, and supply chain members.

A desire is for the supply chain coordinator to automate this maintenance in the portal

25   management solution as well. This is straight forward if the supply chain coordinator continues to use straight cross-reference between retailers and suppliers/distributors as the same tables may probably be accessed by the applications to determine data access in the application. But if hierarchies are used, there may need to be a custom application written to apply the following business rules.

30

When a new retail outlet is added, the application should check to see if that retailer already exists. If it does not, a new retailer entity should be auto-added to the proper group/ the supply chain member node.

5   Each time new retailer information in the address field arrives, the application may compare the new information to the retailer address information to see if data has changed. If yes, the retailer information is updated.

If the retailer is moved from a group node (deleted or reassigned) and it is the last retailer
10   attached to a group node, the group node and corresponding supply chain member should be auto-deactivated.

Each time new retailer information arrives, the retailer's group/supply chain member information should be compared with the group/supply chain member # the retailer is
15   already associated to. If it is different, the retailer should be reassigned (re-linked) to the appropriate group/supply chain member node. The Auto-add/delete processes may run as appropriate.

One issue may be how to auto-associate a retailer to the proper place in a node. In the
20   design phase, available data elements should be examined to see if it is possible. If not, then there should be an "unattached" node not visible to applications outside of the hierarchy management. When the supply chain coordinator adds a retailer to a supply chain member, that member could assign it to the proper hierarchy point through the distributed administration.
25

A second issue may be where to associate the new retailer to the distributor or supplier node. There may the ability to pull attributes from the information the supply chain coordinator puts in their database (distribution center number or supplier ship from location). If an attempt is made to auto-associate the new retailer to other domains
30   beyond the supply chain member's, a check process may be required to make sure the auto-association is correct, otherwise unauthorized data access could occur.

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Comparison to Requested Functions

In a previous section, the features requested by the supply chain coordinator's community were detailed along with the functions those features imply. Table 27 shows whether functions are provided by this approach along with an explanation.

Table 27

Feature	Y/N	Explanation
SECURITY		
Lockout user after n unsuccessful logon attempts	Y	Supported
Notify administrator of lockouts	Y	Supported
On line monitoring		
Provide alternate passwords for lost/forgotten password situations		
Password expiration; require periodic password changes	Y	Supported
Acceptable password length parameters	Y	Supported
Ability to assign/select password	Y	Supported (not self-registration)
Ability to transfer logon intelligence.	Y	Agent to integrate affiliate sites.
Record all activities to the audit log	Y	Supported
COMMUNITY MANAGEMENT		
Distributed community administration	Y	Basic in this option.

222

Feature	Y/N	Explanation
Ability to add, change and delete users.	Y	Supported
Ability to assign access to users	Y	Supported
Ability to create roles or level of users	Y	Supported
Ability to set up default levels of access	Y	Supported
Ability to clone and/or access rights	Y	Supported with configuration
Mass delete of users		
Ability to copy a user ID		
Ability to export user load information from member backend.	Y	Custom
User can be associated with multiple groups.	N	But goal is accomplished with publish privilege feature
HIERARCHIES		
Ability to publish rights and privileges across hierarchies.	Y	Custom hierarchies
Ability to authorize multiple levels of a hierarchy	Y	Custom hierarchies
Ability to manage access against hierarchies	Y	Custom hierarchies
Flexible data access and management.	Y	Custom extensions to support application specific data needed to control data access
DATA PUBLICATION		
User can view or access data in another group in their domain.	Y	Custom

Feature	Y/N	Explanation
User can view or access data in different domain.	Y	Publication supports this, though only real case is the supply chain coordinator board member, and the supply chain coordinator may handle by system admin having a custom feature to assign access privilege to users instead of publishing privilege across domains
POLICY ENFORCEMENT		
Single sign on	Y	Supported
Ability to integrate with affiliates (i.e. other 3rd applications that make up the portal).	Y	Supported
Ability to interface with other applications: the supply chain coordinator 3rd party Remote hosts Platform independent	Y	Supported
Centralized policy management	Y	Supported
REPORTING		
The following community management reports were identified: Master user list Click and view access list User with published data authorization (i.e. users in other domains or sub-domains.	Y	Custom

Feature	Y/N	Explanation
Usage reports		
Lockout notification	Y	
Online monitoring capability		
View audit log	Y	Custom
Parameter driven reports	Y	Custom

Option 4 is the comprehensive community management solution. It requires a lot of customization, a lot of which occurs outside of the SSO/Portal Management solution. It does, however, meet all the functions specified by the supply chain community CTQs.

5

Cost and Timelines

For option 4, the assumption is that the security management solution software provides hierarchies, hierarchy management, and other customizations detailed in this section.

10   Table 28 is a list of assumed functionality for the purpose of cost and level of effort estimation:

<div align="center">Table 28</div>

Feature List	Option 4: Security Management Solution Software + Custom Administration with Advanced Community Structure
Distributed User Administration	Option 3 plus Custom hierarchical community structure at group/role/user level, structure to structure relationship, grant privilege across group, advanced administration features
Administrative Audit Trail	Custom User/Session/Application tracking
Access Management	Web interface to administer authorization and access control, secure portal management and custom agents.
Logon/Password	Basic authentication schemes, X.509, tokens, Forms, RADIUS,

Management	certificates and SSL. Custom notification and online monitoring
Reporting	Custom advanced reporting integrated with monitoring systems
Policy Enforcement	Custom extension of the policy
Data Management	Custom extension

Software and Hardware

From a cost standpoint, Option 4 assumes that both option 2 and 3 are already

5   implemented. Therefore, additional software license fees are not required for security management software. Additional hardware is probably required to support the heavy application and database requirements for hierarchies and their use.

The following is an estimated list of resources that may be required to install and

10   configure the security management solution software, develop the custom community management applications, and program custom data structures to provide the functionality in the table above.

   1 project manager

15   1 business analysis

   1 system integrator

   2 or 3 web/database developers

   1 QA

   1 security consultant

20   Estimated Project Length

   The estimated project length is 6-8 months (assumes completion of options 2 and 3)

Network Considerations

25   The supply chain coordinator can host the web portal itself, co-locate the portal servers at an ISP offering co-location services, or completely outsource the portal management solution (network and servers) to a managed service provider.

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Hosting a Secure Portal

From a network view, the following details best practice for configuration of network servers for the portal.

5

One major issue may be managing a mission-critical network environment where users can execute transactions. The choice of ASP providers must also be a consideration.

10 ## Managed Services

A third option is to outsource all port, router, network and platform management. This is called managed services. There is a difference between managing up to the platform (OS) and the actual portal management solution.

15

The options for managed services to the platform level are the same players. Again, Level 3 is the only large national player in the Miami market. They do not offer managed services on their own, but have a partner program to provide these services. The actual partner for the southern region would need to be confirmed, but it is probably the same

20 company that provides this service in the mid-Atlantic region, named AiNET. A company like AiNET would not have knowledge of the portal management solution itself, but would manage everything else from a security view including attacks against the network and the machines.

25 The next level of managed service includes actually operating and configuring the portal management solution. Companies in this class have resources already trained in the portal management solution and can take ownership of delivering the software and operating it for a community. Each provider has a number of partners in this area; GE Global Exchange Services is one of these companies. GXS provides managed Netegrity

30 solutions along with others. Securant has many system integrator partners, though it is hard to tell who specializes in hosting and operating their solutions.

Application Security

Many of the applications that may sit behind the portal may be developed and operated
by other organizations. The following details some recommendations for applications
built on the NT platform using Microsoft framework and for evaluating ASP provided
applications' security.

Recommended Policies

- Objects must be cleared before they are reused
- Errors during clearing must be handled in a way that ensures objects are not reused without clearing
- Browser caching directives must be used for sensitive pages
- Use of temporary files must be threadsafe
- Temporary files must be removed when no longer required

Approaches

- Clear after use
- Clear before use
- Use finally to ensure that objects are cleared

Vulnerabilities

- Database connection is reused, revealing another user's data
- Object pool includes one user's page with another's user page
- Caching algorithm inappropriately matches a request with a response containing another user's data
- Code Quality

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Recommended Policies

- All code must conform to a consistent style guideline
- All code must be documented
- Intentionally complex code must be justified
- "Easter eggs" shall not be included in the code

Approaches

- Use style guideline from www.microsoft.com
- Use tools to enforce style guidelines
- Use design reviews to catch problems early
- Use peer reviews to prevent hidden problems

Vulnerabilities

- The more flaws the more likely one is to be exploitable by an attacker
- Poor code quality can rise to the level of a security problem
- Concurrent Programming

Recommended Policies

- No thread of execution within the application should be able to substantially affect any other thread

Approaches

- Synchronize access to all shared resources, including files and the session
- Eliminate all class and instance variables, unless final
- SingleThreadModel is not recommended for performance reasons

Vulnerabilities

- Information in shared resources can be inadvertently
- Debugging is difficult as these problems can be difficult to reproduce

5
- Database Access

Recommended Policies

- Parameters used in database queries must not be able to modify the intended

10
query
- Results from queries must match the expected results
- Reliance on database permissions must be minimized and explicitly identified in the implementation
- The username and password used to access the database must have the minimum

15
amount of privilege required by the application

Approaches

- Single encapsulated library for accessing databases

20
- Prepared statements should be used instead of ordinary statements

Vulnerabilities

- Queries can be modified to reveal data or corrupt database

25
- Debugging and Testing

Recommended Policies

- Code that is not used must be eliminated

30
- System.output.println() must not be used

230

Approaches

- Use an assertions framework
- Keep testing code separate from production

5

Vulnerabilities

- High likelihood that this code may inadvertently get enabled
- Security Organization and Metrics

10
- Security Roles
- Chief Security Officer

Develop Policy, Awareness and Training

15
- Define and Continuously Revise Corporate Policy and Standards
- Lead Company Wide Awareness and Training Program

Continuous Security Risk Assessing and Monitoring

20
- Enhance Assessment Tools
- Develop Security Dashboards and Scorecards
- Facilitate Session i

Champion New Security Initiatives

25
- Resource Planning and Budgeting

Drive Business Specific Security Strategic Planning

30
- Align Security Strategy with Business Objectives (e-commerce)
- Resource Planning and Budgeting

Owner of Security Measurements

- Session i, Security Self-Assessment, Corporate and Business Specific Security
  Measurements

Champion Policy Adoption and Training

- Take Security to the Masses
- Security Manager

Lead and Own New Security Initiatives

- Select and Package Latest Technology for New Security Initiatives
- Coordinate with Businesses to Rollout Initiatives

Deliver Company-Wide Architecture and Processes

- Define Technical Security Infrastructure (Single Sign-On,
- Intrusion Detection, Digital Certificates, VPN, etc)

Provide Technical Consulting to Businesses

- Assist Business to Resolve Business Specific Security Issues
- Security Administrator(s)
- Multiple people (Finance, IT, or distributed)

Project Execution of Technology and Process

- Responsible for Implementation in Business Site

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Administration and Operation of Daily IT Security Activities

- Perform IT Security Tasks, Monitor Outsourcing Vendors and Coordinate with 3rd Parties

5
- Security Review Structure

The new technological infrastructure and its associated electronic reporting and feedback systems equips retailer management with accurate, timely, and previously unavailable information from the Supply Chain on sales, marketing and other performance indicators

10   allow Supply Chain management to fully engage in managing supply and distribution processes and channels toward identified and agreed strategic objectives provide franchisees and retailers with the Supply Chain information they need to operate efficiently and make effective management decisions minimally impacts the resources of Supply Chain management.

15

With Supply Chain management assuming full responsibility for managing the fundamentals of the Supply Chain system, Supply Chain participants are strategically positioned to focus on the six business priorities that have been identified: operational excellence, boosting sales growth, focusing resources, discovering the essence of the

20   Brand, image transformation and revitalizing franchisee relations.

Supply Chain Management

Figure **93** is a flowchart of a process **9330** for managing a health and personal care

25   products supply chain utilizing a network. Such health and personal care products include pharmaceuticals, cosmetics, opticals, health carpe products, etc. A network is utilized in operation **9332** to receive data from a plurality of health and personal care products outlets of a health and personal care products supply chain in which the data relates to the sale of health and personal care products by the health and personal care

30   products outlets. An electronic order form is generated in operation **9334** based on the data for ordering health and personal care products from a health and personal care

products distributor of the health and personal care products supply chain. The data is transmitted via the network to the health and personal care products distributor of the health and personal care products supply chain in operation **9336**. The data is also transmitted to a health and personal care products supplier of the health and personal care

5   products supply chain utilizing the network in operation **9338**. Additionally, activity in the health and personal care products supply chain is forecast utilizing the data in operation **9340**.

In one aspect, the data may be parsed to match each of a plurality of health and personal

10   care products distributors and health and personal care products suppliers. As a further aspect, the data may be made accessible to the health and personal care products outlets, the health and personal care products distributor, the health and personal care products supplier via a network-based interface. As an additional aspect, the data may be accessible to the health and personal care products distributor and the health and personal

15   care products supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the health and personal care products outlets, the health and personal care products distributor, and the health and personal care products supplier each may forecast utilizing the data.

20   Figure **94** is a flowchart of a process **9430** for managing an electronics and appliances supply chain utilizing a network. A network is utilized in operation **9432** to receive data from a plurality of computer product outlets of a electronics and appliances supply chain in which the data relates to the sale of computer product by the computer product outlets. An electronic order form is generated in operation **9434** based on the data for ordering

25   computer product from a computer product distributor of the electronics and appliances supply chain. The data is transmitted via the network to the computer product distributor of the electronics and appliances supply chain in operation **9436**. The data is also transmitted to a computer product supplier of the electronics and appliances supply chain utilizing the network in operation **9438**. Additionally, activity in the electronics and

30   appliances supply chain is forecast utilizing the data in operation **9440**.

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In one aspect, the data may be parsed to match each of a plurality of electronics and appliances distributors and electronics and appliances suppliers. In another aspect, the data may be made accessible to the electronics and appliances outlets, the electronics and appliances distributor, the electronics and appliances supplier via a network-based

5   interface. In an additional aspect, the data may be accessible to the electronics and appliances distributor and the electronics and appliances supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the electronics and appliances outlets, the electronics and appliances distributor, and the electronics and appliances supplier each may forecast utilizing the

10   data.

Figure **95** is a flowchart of a process **9530** for managing a transportation equipment supply chain utilizing a network. Transportation equipment can include such things as vehicles, automobiles, motor vehicles, aircraft, watercraft, and the accompanying parts

15   and supplies for each of these, such as engine parts, maintenance supplies (filters, belts, hoses, etc.), washing supplies, etc. A network is utilized in operation **9532** to receive data from a plurality of transportation equipment outlets of a transportation equipment supply chain in which the data relates to the sale of transportation equipment by the transportation equipment outlets. An electronic order form is generated in operation

20   **9534** based on the data for ordering transportation equipment from a transportation equipment distributor of the transportation equipment supply chain. The data is transmitted via the network to the transportation equipment distributor of the transportation equipment supply chain in operation **9536**. The data is also transmitted to a transportation equipment supplier of the transportation equipment supply chain utilizing

25   the network in operation **9538**. Additionally, activity in the transportation equipment supply chain is forecast utilizing the data in operation **9540**.

In one aspect, the data may be parsed to match each of a plurality of transportation equipment distributors and transportation equipment suppliers. In another aspect, the

30   data may be made accessible to the transportation equipment outlets, the transportation equipment distributor, the transportation equipment supplier via a network-based

interface. In an additional aspect, the data may be accessible to the transportation equipment distributor and the transportation equipment supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the transportation equipment outlets, the transportation equipment distributor, and

5   the transportation equipment supplier each may forecast utilizing the data.

Figure **96** is a flowchart of a process **9630** for managing a home products supply chain utilizing a network. Home products can include, for example, building materials, garden equipment and supplies, home furnishings and coverings, furniture, etc. A network is

10   utilized in operation **9632** to receive data from a plurality of home products outlets of a home products supply chain in which the data relates to the sale of home products by the home products outlets. An electronic order form is generated in operation **9634** based on the data for ordering home products from a home products distributor of the home products supply chain. The data is transmitted via the network to the home products

15   distributor of the home products supply chain in operation **9636**. The data is also transmitted to a home products supplier of the home products supply chain utilizing the network in operation **9638**. Additionally, activity in the home products supply chain is forecast utilizing the data in operation **9640**.

20   In one aspect, the data may be parsed to match each of a plurality of home products distributors and home products suppliers. As a further aspect, the data may be made accessible to the home products outlets, the home products distributor, the home products supplier via a network-based interface. As an additional aspect, the data may be accessible to the home products distributor and the home products supplier only after

25   verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the home products outlets, the home products distributor, and the home products supplier each may forecast utilizing the data.

Figure **97** is a flowchart of a process **9730** for managing a food and beverage supply

30   chain utilizing a network. A network is utilized in operation **9732** to receive data from a plurality of food and beverage outlets of a food and beverage supply chain in which the

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data relates to the sale of food and beverage by the food and beverage outlets. An electronic order form is generated in operation **9734** based on the data for ordering food and beverage from a food and beverage distributor of the food and beverage supply chain. The data is transmitted via the network to the food and beverage distributor of the food and beverage supply chain in operation **9736**. The data is also transmitted to a food and beverage supplier of the food and beverage supply chain utilizing the network in operation **9738**. Additionally, activity in the food and beverage supply chain is forecast utilizing the data in operation **9740**.

In one aspect, the data may be parsed to match each of a plurality of food and beverage distributors and food and beverage suppliers. In another aspect, the data may be made accessible to the food and beverage outlets, the food and beverage distributor, the food and beverage supplier via a network-based interface. In an additional aspect, the data may be accessible to the food and beverage distributor and the food and beverage supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the food and beverage outlets, the food and beverage distributor, and the food and beverage supplier each may forecast utilizing the data.

Figure **98** is a flowchart of a process **9830** for managing a machinery supply chain utilizing a network. A network is utilized in operation **9832** to receive data from a plurality of machinery outlets of a machinery supply chain in which the data relates to the sale of machinery by the machinery outlets. An electronic order form is generated in operation **9834** based on the data for ordering machinery from a machinery distributor of the machinery supply chain. The data is transmitted via the network to the machinery distributor of the machinery supply chain in operation **9836**. The data is also transmitted to a machinery supplier of the machinery supply chain utilizing the network in operation **9838**. Additionally, activity in the machinery supply chain is forecast utilizing the data in operation **9840**.

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In one aspect, the data may be parsed to match each of a plurality of machinery distributors and machinery suppliers. In another aspect, the data may be made accessible to the machinery outlets, the machinery distributor, the machinery supplier via a network-based interface. In an additional aspect, the data may be accessible to the machinery

5   distributor and the machinery supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the machinery outlets, the machinery distributor, and the machinery supplier each may forecast utilizing the data.

10 Figure 99 is a flowchart of a process 9930 for managing a sporting goods supply chain utilizing a network. A network is utilized in operation 9932 to receive data from a plurality of sporting goods outlets of a sporting goods supply chain in which the data relates to the sale of sporting goods by the sporting goods outlets. An electronic order form is generated in operation 9934 based on the data for ordering sporting goods from a

15 sporting goods distributor of the sporting goods supply chain. The data is transmitted via the network to the sporting goods distributor of the sporting goods supply chain in operation 9936. The data is also transmitted to a sporting goods supplier of the sporting goods supply chain utilizing the network in operation 9938. Additionally, activity in the sporting goods supply chain is forecast utilizing the data in operation 9940.

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In one aspect, the data may be parsed to match each of a plurality of sporting goods distributors and sporting goods suppliers. In another aspect, the data may be made accessible to the sporting goods outlets, the sporting goods distributor, the sporting goods supplier via a network-based interface. In an additional aspect, the data may be

25 accessible to the sporting goods distributor and the sporting goods supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the sporting goods outlets, the sporting goods distributor, and the sporting goods supplier each may forecast utilizing the data.

30 Figure 100 is a flowchart of a process 10030 for managing a chemical supply chain utilizing a network. A network is utilized in operation 10032 to receive data from a

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plurality of chemical outlets of a chemical supply chain in which the data relates to the sale of chemical by the chemical outlets. An electronic order form is generated in operation **10034** based on the data for ordering chemical from a chemical distributor of the chemical supply chain. The data is transmitted via the network to the chemical

5   distributor of the chemical supply chain in operation **10036**. The data is also transmitted to a chemical supplier of the chemical supply chain utilizing the network in operation **10038**. Additionally, activity in the chemical supply chain is forecast utilizing the data in operation **10040**.

10   In one aspect, the data may be parsed to match each of a plurality of chemical distributors and chemical suppliers. As a further aspect, the data may be made accessible to the chemical outlets, the chemical distributor, the chemical supplier via a network-based interface. As an additional aspect, the data may be accessible to the chemical distributor and the chemical supplier only after verification of an identity thereof. In another aspect,

15   the network may include the Internet. In a further aspect, the chemical outlets, the chemical distributor, and the chemical supplier each may forecast utilizing the data.

Figure **101** is a flowchart of a process **10130** for managing a department store supply chain utilizing a network. A network is utilized in operation **10132** to receive data from a

20   plurality of department store outlets of a department store supply chain in which the data relates to the sale of department store by the department store outlets. An electronic order form is generated in operation **10134** based on the data for ordering department store from a department store distributor of the department store supply chain. The data is transmitted via the network to the department store distributor of the department store

25   supply chain in operation **10136**. The data is also transmitted to a department store supplier of the department store supply chain utilizing the network in operation **10138**. Additionally, activity in the department store supply chain is forecast utilizing the data in operation **10140**.

30   In one aspect, the data may be parsed to match each of a plurality of department store distributors and department store suppliers. As a further aspect, the data may be made

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accessible to the department store outlets, the department store distributor, the department store supplier via a network-based interface. As an additional aspect, the data may be accessible to the department store distributor and the department store supplier only after verification of an identity thereof. In another aspect, the network may include the

5   Internet. In a further aspect, the department store outlets, the department store distributor, and the department store supplier each may forecast utilizing the data.

Figure **102A** is a flowchart of a process **10230** for managing an office product supply chain utilizing a network. Note that office products can include, for example, furniture as

10   well as items typically referred to as office supplies. A network is utilized in operation **10232** to receive data from a plurality of office product outlets of an office product supply chain in which the data relates to the sale of office product by the office product outlets. An electronic order form is generated in operation **10234** based on the data for ordering office product from an office product distributor of the office product supply

15   chain. The data is transmitted via the network to the office product distributor of the office product supply chain in operation **10236**. The data is also transmitted to an office product supplier of the office product supply chain utilizing the network in operation **10238**. Additionally, activity in the office product supply chain is forecast utilizing the data in operation **10240**.

20

In one aspect, the data may be parsed to match each of a plurality of office product distributors and office product suppliers. As a further aspect, the data may be made accessible to the office product outlets, the office product distributor, the office product supplier via a network-based interface. As an additional aspect, the data may be

25   accessible to the office product distributor and the office product supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the office product outlets, the office product distributor, and the office product supplier each may forecast utilizing the data.

30   Figure **102B** is a flow diagram of a process **10260** for managing a book supply chain utilizing a network. In operation **10262**, a network is utilized to receive data from a

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plurality of book outlets of a book supply chain in which the data relates to the sale of books by the book outlets. In operation **10264**, an electronic order form is generated based on the data for ordering book from a book distributor of the book supply chain. In operation **10266**, the data is transmitted via the network to the book distributor of the

5   book supply chain. In operation **10268**, the data is also transmitted to a book supplier of the book supply chain utilizing the network. In operation **10270**, activity in the book supply chain is forecast utilizing the data.

In one aspect, the data may be parsed to match each of a plurality of book distributors and

10   book suppliers. In another aspect, the data may be made accessible to the book outlets, the book distributor, the book supplier via a network-based interface. In an additional aspect, the data may be accessible to the book distributor and the book supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the book outlets, the book distributor, and the book supplier

15   each may forecast utilizing the data.

Figure **103** is a flowchart of a process **10330** for managing a gas station supply chain utilizing a network. In operation **10332**, a network is utilized to receive data from a plurality of gas station outlets of a gas station supply chain in which the data relates to the

20   sale of gas station goods and services by the gas station outlets. In operation **10334**, an electronic order form is generated based on the data for ordering gas station goods and services from a gas station distributor of the gas station supply chain. The data is transmitted via the network to the gas station distributor of the gas station supply chain in operation **10336**. The data is also transmitted to a gas station supplier of the gas station

25   supply chain in operation **10338** utilizing the network. Additionally, activity in the gas station supply chain is forecast in operation **10340** utilizing the data.

In one aspect, the data may be parsed to match each of a plurality of gas station distributors and gas station suppliers. In another aspect, the data may be made accessible

30   to the gas station outlets, the gas station distributor, the gas station supplier via a network-based interface. In an additional aspect, the data may be accessible to the gas

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station distributor and the gas station supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the gas station outlets, the gas station distributor, and the gas station supplier each may forecast utilizing the data.

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Figure **104A** is a flowchart of a process **10430** for managing a convenience store supply chain utilizing a network. A network is utilized in operation **10432** to receive data from a plurality of convenience store outlets of a convenience store supply chain in which the data relates to the sale of convenience store by the convenience store outlets. In

10   operation **10434**, an electronic order form is generated based on the data for ordering convenience store from a convenience store distributor of the convenience store supply chain. The data is transmitted via the network to the convenience store distributor of the convenience store supply chain in operation **10436**. In operation **10438**, the data is transmitted to a convenience store supplier of the convenience store supply chain

15   utilizing the network. In operation **10440**, activity in the convenience store supply chain is forecast utilizing the data.

In one aspect, the data may be parsed to match each of a plurality of convenience store distributors and convenience store suppliers. In another aspect, the data may be made

20   accessible to the convenience store outlets, the convenience store distributor, the convenience store supplier via a network-based interface. In an additional aspect, the data may be accessible to the convenience store distributor and the convenience store supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the convenience store outlets, the convenience

25   store distributor, and the convenience store supplier each may forecast utilizing the data.

Figure **104B** is a flow diagram of a process **10460** for managing a toy supply chain utilizing a network. In operation **10462**, a network is utilized to receive data from a plurality of toy outlets of a toy supply chain in which the data relates to the sale of toys

30   by the toy outlets. In operation **10464**, an electronic order form is generated based on the data for ordering toy from a toy distributor of the toy supply chain. In operation **10466**,

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the data is transmitted via the network to the toy distributor of the toy supply chain. In operation **10468**, the data is also transmitted to a toy supplier of the toy supply chain utilizing the network. In operation **10470**, activity in the toy supply chain is forecast utilizing the data.

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In one aspect, the data may be parsed to match each of a plurality of toy distributors and toy suppliers. In another aspect, the data may be made accessible to the toy outlets, the toy distributor, the toy supplier via a network-based interface. In an additional aspect, the data may be accessible to the toy distributor and the toy supplier only after verification of

10 an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the toy outlets, the toy distributor, and the toy supplier each may forecast utilizing the data.

Figure **105** is a flowchart of a process **10530** for managing an entertainment media supply

15 chain utilizing a network. Such entertainment media may include mediums with music and/or video stored thereon, etc. In operation **10532**, a network is utilized to receive data from a plurality of entertainment media outlets of an entertainment media supply chain in which the data relates to the sale of entertainment media by the entertainment media outlets. In operation **10534**, an electronic order form is generated based on the data for

20 ordering entertainment media from an entertainment media distributor of the entertainment media supply chain. In operation **10536**, the data is transmitted via the network to the entertainment media distributor of the entertainment media supply chain. In operation **10538**, the data is transmitted to an entertainment media supplier of the entertainment media supply chain utilizing the network. In operation **10540**, activity in

25 the entertainment media supply chain is forecast utilizing the data.

In one aspect, the data may be parsed to match each of a plurality of entertainment media distributors and entertainment media suppliers. In another aspect, the data may be made accessible to the entertainment media outlets, the entertainment media distributor, the

30 entertainment media supplier via a network-based interface. In an additional aspect, the data may be accessible to the entertainment media distributor and the entertainment

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media supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the entertainment media outlets, the entertainment media distributor, and the entertainment media supplier each may forecast utilizing the data.

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Figure **106** is a flowchart of a process **10630** for managing an accommodation supply chain utilizing a network. A network is utilized in operation **10632** to receive data from a plurality of accommodation outlets of an accommodation supply chain in which the data relates to the sale of accommodation by the accommodation outlets, such as hotels,

10   motels, inns, resorts, casinos, etc. An electronic order form is generated in operation **10634** based on the data for ordering accommodation from an accommodation distributor of the accommodation supply chain. The data is transmitted via the network to the accommodation distributor of the accommodation supply chain in operation **10636**. The data is also transmitted to an accommodation supplier of the accommodation supply

15   chain utilizing the network in operation **10638**. Additionally, activity in the accommodation supply chain is forecast utilizing the data in operation **10640**.

In one aspect, the data may be parsed to match each of a plurality of accommodation distributors and accommodation suppliers. As a further aspect, the data may be made

20   accessible to the accommodation outlets, the accommodation distributor, the accommodation supplier via a network-based interface. As an additional aspect, the data may be accessible to the accommodation distributor and the accommodation supplier only after verification of an identity thereof. In another aspect, the network may include the Internet. In a further aspect, the accommodation outlets, the accommodation

25   distributor, and the accommodation supplier each may forecast utilizing the data.

Figure **107** is a flowchart of a process **10730** for a reverse auction in a supply chain management framework. Data is received in operation **10732** from a plurality of stores of a supply chain utilizing a network. The data relates to the sale of goods by the stores.

30   An electronic order form is generated based on the data for ordering goods from a distributor of the supply chain in operation **10734**. The data is then transmitted to

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suppliers of the supply chain utilizing the network in operation **10736** so that the suppliers can offer raw products used for producing the goods at a predetermined price, with the price decreasing as a function of time during a predetermined duration.

5   In one aspect, the data is parsed to match each of a plurality of distributors. In such an aspect, the data may be made accessible to the stores, the distributor, the suppliers via a network-based interface. As a further aspect, the data may be accessible to the distributor and the suppliers only after verification of an identity thereof. In another aspect, the suppliers are chosen by the stores. In a further aspect, the stores, the distributor, and the

10   suppliers each forecast utilizing the data.

Figure **108** is a flowchart of a process **10830** for tracking non-conforming goods in a supply chain management framework. Note that as used herein, "non-conforming goods includes damaged goods, mislabeled goods, and inappropriate goods, etc. Thus, it should

15   be understood that this process **10830** may also be utilized for tracking product withdrawals and recalls, as well as tracking wrong products at the wrong time for the wrong purpose so that incorrectly shipped products can be promptly identified so that damaged product, wrong product, incorrect amounts of product are identified and tracked. A network is utilized in operation **10832** to receive data from a plurality of

20   stores of a supply chain. This data relates to the sale of goods by the stores. An electronic order form is generated based on the data for ordering goods from a distributor of the supply chain in operation **10834**. When the ordered goods are received in operation **10836**, information relating to any non-conforming goods delivered by the distributor is entered in operation **10838** and aggregated in a database in operation **10840**.

25   The aggregated information is subsequently transmitted to the distributor utilizing the network in operation **10842**.

In one aspect, the information relates to an amount of damage to the goods. In such an aspect, the information may also relate to a type of damage to the goods. In another

30   aspect, a plurality of electronic order forms are generated based on the data for ordering goods from a plurality of distributors of the supply chain. As an aspect in this aspect, the

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information may be parsed based on the distributor. As a further aspect, a comparison may be performed between the parsed data for each of the distributors. In another aspect, invoices may be automatically adjusted to account for the damaged/nonconforming goods. In yet another aspect, the goods may be salvaged, such as by being donated to

5   charity, shipped back to the distributor, resold, etc.

Figure **109** is a flowchart of a process **10900** for allocating responsibilities in a supply chain management framework. An agreement between a plurality of parties in a supply chain is received in operation **10902**. A plurality of terms of the agreement are identified

10   in operation **10904** which are then parsed in operation **10906** into at least a pair of groups including a first group of terms that includes commercial terms and a second group of terms that includes brand identity terms. Also, each of the terms outlines a responsibility. These responsibilities are allocated among the parties based on the parsing in operation **10908**.

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In one aspect, a first party is allocated the responsibilities outlined by the first group of terms and a second party is allocated the responsibilities outlined by the second group of terms. In another aspect, the parties are allocated the responsibilities outlined by one of the groups of terms. In a further aspect, the agreement is received utilizing network. In

20   such an aspect, the terms may be parsed automatically utilizing a template. As a further aspect, the responsibilities may be allocated by transmitting electronic mail utilizing the network. In an additional aspect, the agreement includes an operating agreement.

Figure **110** is a flowchart of a process **11000** for determining product supply parameters

25   in a supply chain management framework. Product supply parameters may include information including the following: price/volume/weight/fob/minimum quantity/payment terms/product specifications. Data is received from a plurality of supply chain participants of a supply chain utilizing a network in operation **11002**. The received data relates to the sale of products by the supply chain participants. Product

30   supply parameters corresponding to each supply chain participant are then determined based on information including the data in operation **11004**. Next, corresponding product

supply parameters is communicated to at least one supply chain participant in operation **11006**.

In one aspect, the product supply parameters are determined by a brand owner. In another aspect, the data is transmitted to the distributor and a supplier in accordance with the product supply parameters. In a further aspect, the network includes the Internet. In an additional aspect, forecasting is carried out as a function of the data and the product supply parameters. In another aspect, the product supply parameters indicate a price and an amount of the products to be ordered. In such an aspect, the product supply parameters may also indicate the price and the amount of the products to be ordered utilizing a look-up table which correlates the data to an appropriate price and amount.

Figure **111** is a flowchart of a process **6200** for reducing costs in a supply chain management framework. Data is received from a plurality of supply chain participants utilizing a network in operation **11102**. The received data relates to the sale of products by the supply chain participants. Rules are determined to ensure the incurrence of minimal costs to the supply chain participants in operation **11104** and the rules are applied to ensure supply to the supply chain participants at minimal cost without requiring the supply chain manager to take title to any goods in operation **11106**.

In one aspect, the rules are determined by a brand owner. In another aspect, the rules indicate a distributor to which the electronic order form is to be sent. In a further aspect, the rules indicate an amount of the products to be ordered from the distributor of the supply chain. In an additional aspect, forecasting is carried out as a function of the rules. In another aspect, promotion planning is carried out as a function of the rules.

Figure **112** is a flowchart of a process **11200** for handling contracts in a supply chain management framework. One of a plurality of contracts is selected in operation **11202**. The selected contract template is transmitted to a supply chain participant in operation **11204**. Data is received from supply chain participants utilizing a network in operation

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11206. This data relates to the sale of products by the supply chain participants. The contract templates are then enforced in accordance with the data in operation 11208.

In one aspect, the contract templates compliment each other. In another aspect, each contract template includes portions to be filled out by the supply chain participants. In a further aspect, the selected contract template is transmitted to the supply chain participant utilizing the network. In an additional aspect, the network includes the Internet. In another aspect, an indication of acceptance of the contract is received from the supply chain participant.

Figure 113 is a flowchart of a process 11300 for centralizing a supply chain management framework in which a plurality of distributors of a supply chain are registered in operation 11302. Distribution management rights are then assigned from the distributors to a supply chain manager in operation 11304. Subsequently, data from a plurality of outlets of the supply chain is received utilizing a network in operation 11306. The received data relates to the sale of products by the outlets. The use of the data is managed during the distribution of products to the outlets by the distributors in operation 11308. This management of data use is handled by the supply chain manager.

In one aspect, the assignment is capable of being terminated based on gross negligence on the part of the supply chain manager. In another aspect, the distributors are registered utilizing the network. In a further aspect, the managing includes determining an amount of the products to be distributed to the outlets. In an additional aspect, the managing includes determining a timing of distribution of the products to be distributed to the outlets. In yet another aspect, the managing includes the selection of the distributors to distribute products to the outlets.

Figure 114 is a flowchart of a process 11400 for providing local distribution committees in a supply chain management framework. A plurality of distributors of a supply chain are registered in operation 11402. Through a supply chain manager, a local distribution committee is organized and assigned for each distributor in operation 11406. Data from a

plurality of outlets of the supply chain is subsequently received utilizing a network in operation **11408**. This received data relates to the sale of products by the outlets. The data is then transmitted to each of the distributors via the corresponding local distribution committee utilizing the network in operation **11410**.

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In one aspect, the data is organized by the corresponding local distribution committee prior to transmission to the distributors. In another aspect, the data is processed by the corresponding local distribution committee prior to transmission to the distributors. In a further aspect, each local distribution committee utilizes the data for forecasting and then
10   transmits the forecasting to the corresponding distributors. In an additional aspect, the distributors are organized and assigned a local distribution committee based on a location thereof. In even another aspect, each local distribution committee includes a network-based interface for transmitting the data.

15   Figure **115** is a flowchart of a process **11500** for price auditing in a supply chain management framework. A network is utilized in operation **11502** to collect data from a plurality of stores of a supply chain that relates to the sale of goods by the stores. Electronic order forms are generated in operation **11504** based on the data for ordering goods from a plurality of distributors of the supply chain and then sent to the distributors
20   in operation **11506** utilizing the network. In response, invoices are received from the distributors utilizing the network in operation **11508**. A price for the goods is then calculated utilizing the electronic order forms and the invoices in operation **11510**. Subsequently, the price is audited in operation **11512**.

25   In one aspect, the price is audited by comparing the price to a predetermined amount. In another aspect, the price of the goods is calculated from the electronic order forms utilizing a table mapping a plurality of goods with a plurality of prices. In a further aspect, the electronic order forms are generated by the stores. In an additional aspect, the electronic order forms are generated by the stores. In yet another aspect, an electronic
30   mail alert is generated in response to the audit.

Figure **116** is a flowchart of a process **11600** for auditing performance in a supply chain framework. Data is collected from a plurality of supply chain participants utilizing a network in operation **11602**. This data relates to the sale of goods by the supply chain participants. Access to the data is allowed utilizing a network-based interface in operation **11604**. Electronic order forms are generated based on the data for a supply chain participant in operation **11606**. The generated electronic order forms are sent to the to the supply chain participant utilizing the network in operation **11608**. A performance of the delivery of the goods by the supply chain participant is then tracked in operation **11610**. The tracked performance of the delivery of the goods by the supply chain participant is subsequently audited in operation **11612**.

In one aspect, the performance may be audited by comparing the performance to a performance indicated on the electronic order forms. In another aspect, the performance may indicate a day of the delivery. In a further aspect, the performance may indicate an hour of the delivery. In an additional aspect, the performance may be tracked by entering the performance utilizing the network-based interface. In another aspect, an electronic mail alert may be generated in response to the audit.

Figure **117** is a flowchart of a process **11700** for providing an electronic mail virtual private network in a supply chain management framework. Utilizing a network, data is collected in operation **11702** from a plurality of outlets of a supply chain that relates to the sale of goods by the outlets. Access to the data is allowed in operation **11704** utilizing a network-based interface. The data is processed in operation **11706** and then sent in operation **11708** using electronic mail via the network to one or more of the following: a supplier, a distributor and the outlets in the supply chain.

In one aspect, the network includes the Internet. In another aspect, the processed data is sent to the supplier, the distributor, and the outlets. In such an aspect, the supplier, the distributor, and the outlets may be registered with a process that includes the collection of electronic mail addresses thereof. In further aspect, the processed data includes

forecasting, promotion planning, and ordering. In an additional aspect, the processed data may be sent to a supplier, a distributor, as well as outlets indicated by the data.

Figure **118** is a flowchart of a process **11800** for secret pricing in a supply chain management framework. An agreement is negotiated with a supplier of a supply chain that sets a first price for a predetermined product in operation **11802**. The predetermined product is then ordered from the supplier by a purchasing supply chain participant in operation **11804**. Data is collected from a plurality of supply chain participants utilizing a network in operation **11806**. The data relates to the sale of goods by the supply chain participants. An invoice is subsequently received from the supplier by the purchasing supply chain participant in operation **11808**. This the invoice reflects a second price for the predetermined product which is different from the first price.

In one aspect, the ordering is carried out utilizing a network. In a similar aspect, the receiving is carried out utilizing a network. In another aspect, the second price is a function of the first price. For example, the first price may be a percentage of the second price. In further aspect, the second price is converted to the first price prior to processing. In such an aspect, the processing may include market analysis. In yet another aspect, a supply chain manager may collect from the supplier an amount equal to a difference between the second price and the first price.

Figure **119** is a flowchart of a process **11900** for managing risk in a supply chain management framework. A network is utilized in operation **11902** to receive data from a plurality of outlets of a supply chain that relates to an amount of products sold by the outlets. A maximum acceptable amount of loss is determined in operation **11904** and the maximum acceptable amount of loss is translated to acceptable ordering standards in operation **11906**. An electronic order form is then generated based on the data and the acceptable ordering standards for ordering products from a distributor of the supply chain in operation **11908**.

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In one aspect, the maximum acceptable amount of loss includes a predetermined amount of money. In another aspect, the acceptable ordering standards allow the calculation of a maximum amount of products that can be ordered as a function of the data. In a further aspect, the acceptable ordering standards allow the calculation of a maximum price of

5   products that can be ordered as a function of the data. In an additional aspect, the translating is carried out utilizing a look-up table. In yet another aspect, an alert is generated upon the products ordered based on the data not meeting the acceptable ordering standards.

10   Figure **120** is a flowchart of a process **12000** for product tracking in a supply chain management framework. Data is received from a plurality of outlets of a supply chain utilizing a network in operation **12002**. The received data relates to an amount of products sold by the outlets. Electronic order forms are generated based on the data for ordering products from a distributor of the supply chain in operation **12004**. The

15   electronic order forms indicate an amount of the products ordered by each outlet. An amount and a location of the products are tracked utilizing the data and the forms in operation **12006**.

In one aspect, the products may be tracked for recall purposes. In another aspect, the

20   amount and the location of the products may be tracked by subtracting the amount of products sold from the amount of products ordered for each of the outlets. In a further aspect, the amount and the location of the products may be audited. In an additional aspect, the amount of products sold and the amount of products ordered may be accessible via a network-based interface. In yet another aspect, the network includes the

25   Internet.

Figure **121** is a flowchart of a process **12100** for auctioning surplus products in a supply chain management framework. Utilizing a network, data is received from a plurality of outlets of a supply chain in operation **12102**. The received data relates to an amount of

30   products sold by the outlets. The received data is then made accessible to the outlets, distributors, and suppliers utilizing a network based interface in operation **12104**.

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Utilizing the network-based interface, surplus products from at least one of the outlets are auctioned in operation **12106**.

In one aspect, the outlets, the distributors, and the suppliers may be provided access to the network-based interface. In such an aspect, the outlets, the distributors, and the suppliers may also be capable of submitting bids utilizing the network-based interface. In another aspect, the network includes the Internet. In a further aspect, the auctioning may be initiated in response to one of the outlets closing.

Figure **122** is a flowchart of a process **12200** for managing a supply chain utilizing a network. Data is received from a plurality of outlets of a supply chain utilizing a network in operation **12202**. The received data relates to the sale of products by the outlets. An electronic order form is then generated in operation **12204** based on the data for ordering products from a distributor of the supply chain. Access to the data is provided in operation **12206** utilizing a network-based interface equipped to handle secure sockets layer (SSL) protocol.

In one aspect, the access may be provided only after verification of a password and a user name. In another aspect, the network-based interface may be capable of timing out after a predetermined amount of time. In a further aspect, the data and electronic order form may be encrypted. In yet another aspect, the network includes the Internet. In an additional aspect, the outlets, the distributor, and a supplier each may be provided access to the network-based interface.

Figure **123** is a flowchart of a process **12300** for managing a supply chain utilizing a network. Data from a plurality of outlets of a supply chain is received utilizing a network in operation **12302**. The received data relates to the sale of products by the outlets. An electronic order form is generated in operation **12304** based on the data for ordering products from a distributor of the supply chain. Access to the data is allowed utilizing a network-based interface in operation **12306**.

In one aspect, forecasting may be made available on the network-based interface. In another aspect, promotion planning may be made available on the network-based interface. In a further aspect, the network includes the Internet. In an additional aspect, the outlets, the distributor, and a supplier may be allowed access to the data.

5

Figure **124** is a flowchart of a process **12400** for disseminating calendar information in a supply chain utilizing a network. A network is utilized in operation **12402** to receive data from a plurality of outlets of a supply chain relating to the sale of products by the outlets. A calendar of events is generated in operation **12404**. Access to the calendar of events is

10   allowed utilizing a network-based interface in operation **12406**.

In one aspect, the calendar of events may be generated based at least in part on the data. In another aspect, the calendar of events may be generated based at least in part on promotion planning. In further aspect, the network includes the Internet. In an additional

15   aspect, the access to the calendar of events may be restricted to only a predetermined set of the outlets. In such an aspect, the restricted access may be enforced utilizing passwords as a further option.

Illustrative Embodiment

20

This section illustrates a Supply System according to an exemplary embodiment of the present invention. Accordingly, Figure **125** illustrates a graphical user interface **12500** for generating cost system components. The basic components of the cost system are Items **12502**, FOB points (Supplier Sites) and Distribution Centers. To add to or modify a

25   cost system component, the relevant component is selected from the Supply menu. Then New **12602** is selected from selection screen **12600**. See Figure **126**.

Figure **127** illustrates an Add Items window **12700** displayed upon selecting Items from the Supply menu and New from the selection screen. Several fields of the window are:

30

- **Item Desc** 12702:   Enter a uniquely identifying Item description. This is the name that will appear on all reports including Landed Cost reports, Price Notifications and Contract Exhibits. (The sections entitled Building Cost Matrices and Creating Contracts, below, provide an explanation of these reports.) Figure **128** illustrates a Landed Cost Report **12800** by Distribution Center.

- **Product Cat Code:**   Product category, for example, dry, refrigerated, frozen etc.

- **Item Rank:**   Optional, Test, Mandatory or Unknown.

Note that the underlined data indicates that the information is required.

Figure **129** illustrates an Item/FOB button **12900** that calls up an FOB window **13000** (see Figure **130**) upon its selection. If FOB points are already in the system, Item / FOB associations (Who can supply the product) can be created from this screen. A procedure for adding new FOB points is set forth below.

The information entered for each Item FOB has many implications throughout the purchasing automation systems. The values are used on many of the reports provided to Suppliers, Distributors and Board Members as well as being an integral part in Bid and Least Cost calculations. The following list defines several of the fields of the FOB window. Self-explanatory columns are omitted.

- **Supplier Item Desc:** Item description by which the Supplier identifies the Item. This may not always agree with the Supply Chain coordinator's description and in some cases the Supplier may have the same item description for many Supply Chain coordinator items, for example, promotional cups. **PN** (**PN** – Data is used on a Price Notification)
- **Item Size:**   Used to store case dimensions; can be replaced by case specific columns. **PN**
- **Item No:**   Suppliers Item number. **PN**

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- **Case Length, Width, Depth:**   Product of the columns should equal the Item Cube.

- **Tie / High Quantity:** Case Width and Height on a pallet, i.e. 3 Cases across on 4 levels. **PN**

5

- **Item Cube:**   Volume per case. **PN / BLC (BLC** – Data is mandatory to complete the Bid / Least Cost calculations.)

- **Cases per Truckload:**   # cases per truck. **PN / BLC**

- **Gross Weight:**   Gross Weight of each case. **PN / BLC**

10   The process for adding FOB points is essentially the same as adding Items. In this case, Supplier Sites is selected from the Supply System main menu, then New on the selection screen. Figure **131** illustrates a window **13100** for adding an FOB point. In the Site Name field **13102**, the name of the site is entered. One standard naming convention for a supplier site is SUPPLIER NAME – CITY, STATE. The Site Role field identifies the

15   role of the site. Only sites that have been marked with a role of "FOB Shipping Point" or "Corporate & FOB Point" are available to the purchasing systems when building cost matrices, creating Bids, etc.

The Supplier should be added to the system before identifying the FOB points. In many

20   cases the Suppliers headquarters is also an FOB point. These records will be identified with a site role of "Corporate & FOB Point". See below for a further explanation of Site roles.

Figure **132** depicts a screen **13200** for adding Distribution Centers. Distribution Centers

25   are added much less frequently and basically have to satisfy the same requirements as FOB points. They must have a role of "FOB Shipping Point" or "Corporate & FOB Point" and have an "Active" status in order to be selected.

Figure **133** is a flowchart of a process **13300** for creating cost system components in a

30   supply chain utilizing a network in accordance with an embodiment of the present invention. A plurality of items are defined utilizing a graphical user interface in

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operation **13302**. A supplier site is selected from a set utilizing the graphical user interface in operation **13304**. The set of supplier sites is determined based on the definition of the items. A distribution center is also determined utilizing the graphical user interface in operation **13306**. The distribution center is designated to interface with the supplier site for distribution of the items.

In one aspect of the present invention, the items may be defined utilizing an item identifier, a category, and a rank. In another aspect, the set of supplier sites may be determined utilizing on an association between the definition of the items and the supplier sites. In an additional aspect, the set of supplier sites may be capable of supplying the defined items. In a further aspect, the supplier sites may be defined utilizing a name and a role identifier. In an additional aspect, the items are defined, the supplier site selected, and the distribution center determined utilizing a network.

Building Cost Matrices

Once the basic components of the cost system have been created, the matrices can either be manually created or can be generated by the Least Cost system after completion of analysis. (See the section entitled Creating the Cost Matrices, below, for a detailed explanation of this option.)

Figure **134** illustrates a matrix window **13400**. Matrices can be created from scratch or by making a copy of a previous matrix using a New Using Previous option. The important options at the top of the matrix window are as follows:

- **Begin: / End:** Identifies the starting point and length of the current model. Matrices cannot overlap and at the point one attempts to save an overlapping matrix, he or she will be prompted to change the dates.
- **Final:** Only matrices that have been finalized will appear on all published reports in the system. Note that even if the dates suggest that this matrix is current, the fact that the final indicator is left unchecked will filter it from reports.

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- **Apply By:** This feature allows a user to effect a change to one or multiple records. For example, say an Items Invoice FOB price will be the same regardless of the FOB point. If the price for one FOB point is entered, and "Apply By" Supplier is selected, the system would automatically copy the same value to all other FOB points belonging to that Supplier.

Figure **135** illustrates a matrix **13500**. Matrices are preferably used to display performance metrics in an organized and easily understandable manner. Such performance metrics include on time delivery, fill rate, perfect delivery, lead-time, payment periods, costs, order charges, etc.

The primary purpose of a matrix is to identify the source and destination for the product in question. In this example, the Ameriserve Denver Distribution Center (DC) will be supplied by Tyson's Greenforest, Arkansas FOB point.

Figure **136** illustrates an FOB matrix **13600**. Columns in the matrix are set forth below.

- **Con FOB** the Contract FOB is the actual price from the FOB point selected on the current record. In the case of volume pricing, this signifies the price at the volume breakpoint, based on the total award to this FOB point across all DC's.
- **Inv FOB** the Invoice FOB is the weighted average contract FOB for the current matrix. Each contract fob price is weighted based on the volume on that particular lane. This is the price that the DC will actually receive on their invoice. All DC's receive the same invoice price with the exceptions of RDC lanes (See below for a more detailed explanation.)
- **Freight** Actual freight charge on the lane.
- **Landed** the actual cost to the Distribution Center.

Figure **137** illustrates a contract matrix **13700** displayed upon selection of the Contract button **13800** shown in Figure **138**.

- **Contr** The contract that covers this item and date range. (See the section entitled Creating Contracts for a detailed explanation.) The contract is associated with the Matrix by selecting the Contract Link option on the toolbar.

- **LB** The total weight of product (generally only for beef) on this lane.

5

- **Trk** The number of trucks that the weight entered represents.

- **Routing** The routing option used on this lane. Either Full Truckload (TL), Less than Truckload (LTL), Re-distribution (RDC) or Truckload with a minimum (TLMIN). The section entitled **Optimal Product Routing** provides a detailed description with examples of each routing type.

10

Figure **139** depicts a minimum order matrix **13900**. Matrix items include:

- **Min Ordr / UM** When the usage on a lane suggests that the DC will not order full truckloads, the minimum order for TLMIN orders can be specified

15 using these columns.

- **Slip** Whether the product ships on Slipsheets or Pallets.

- **Deliv.** In certain cases the Suppliers will quote only a price directly to the Distribution Center. In these scenarios the Invoice FOB, Contract FOB, Freight and Landed columns will be blank and the delivered price is entered here.

20

Figure **140** illustrates a shipping matrix **14000**.

- **Carrier** Rail, Truck, Ship etc. The method of shipment.

- **Stated Vol** the expected volume on the lane. This number will show up on the

25 contract reports discussed in the next section.

Once the matrix is complete, it should be finalized and saved.

At this point the Distribution Center (DC) Price notification can be generated. This

30 communicates to the DC's their FOB points selected and relevant pricing, and is generated by selecting the Price Notification option from the Options menu **14100**

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(Figure **141**) or the Notification toolbar button **14200** (Figure **142**). Supplier confirmation is provided with the contract for all items except Beef.

For example, since beef pricing is changed much more frequently than other products,
5 their contracts cover multiple cost matrices. They have a separate DC Notification and Supplier Confirmation report, which is only enabled when working with beef items.

The beef reports are generated in letter format and automatically combine all beef items into the same report.
10
Figure **143** illustrates selection of a Multi-Item Price Notification **14300**. If a Price Notification is generated from the cost matrix window, it will only include the current item. Also provided can be the facility to generate multi-item price notifications. The windows standard paradigm of CTRL+CLICK and SHIFT+CLICK can be used to select
15 multiple items on the item selection window. The report will automatically combine all selected items in one report, but may or may not be possible to select two matrices for the same item.

Figure **144** is a flowchart of a process **14400** for utilizing cost models in a supply chain
20 utilizing a network in accordance with an embodiment of the present invention. At least one item to be distributed is identified utilizing a graphical user interface in operation **14402**. A cost model is associated with the item utilizing the graphical user interface in operation **14404**. The graphical user interface is then utilized to determine a time frame during which the cost model is valid in operation **14406**. The cost model identifies a
25 contract cost, an invoice cost, and a landed cost associated with the distribution of the item.

In one embodiment of the present invention, reports for each of the items may be generated utilizing the cost model. As a further aspect, at least one of the reports may be
30 for a plurality of the items. In one aspect, the cost model identifies a source and a destination of the item. In another aspect, a plurality of the cost models may be available

for being associated with the item. In a further aspect, the item may be identified and the cost model associated with the item utilizing a network.

Creating Contracts

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The Price Notification reports, discussed in the previous section provide the communication link with the DC's, whereas the Supplier reports are generated within the contracts system.

10   In order to link contracts to cost matrices as discussed in the previous section, the relevant items must first be associated with the contract. An item selection screen is accessed such as by selecting a New Item button **14500** as shown in Figure **145**. The item selection screen works in the same manner as the selection screens discussed in the section on "Creating Cost Components".

15

Preferably, Item / Contract associations cannot overlap; in other words there cannot be two contracts for the same items with a Supplier at the same time. The system will automatically prevent creation of this situation.

20   Figure **146** illustrates a Contract/Buyer association screen **14600**.

- **Contract ID:** The contract number is assigned automatically by the system once the user saves for the first time.
- **Current Buyer:**   Products frequently change hands as buyer responsibility's
25   change. The present invention provides the ability to select the current buyer to accommodate this fact.

Figure **147** depicts a contract schedule screen **14700**. Pertinent fields are:

30   - **Contract Start / End:**   Contracts can span multiple matrices, but cannot overlap. The dates will appear on all reports sent to the Supplier.

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- **Effective:**   Either shipment or order date.
- **Payment Terms:**   Terms of payment.

Lead-time, Effective and Payment Terms all appear on the DC Price notification.

5

The present invention also generates several reports. A Generate button **14800**, shown in Figure **148**, links to Microsoft Word and populates required fields with the contract information. Once created, a contract cannot be overwritten by the system. Further, contracts can only be removed by an administrative department.

10

Figure **149** illustrates an Exhibit A button **14900**, which upon selection provides the Supplier with the "Approved Products" listing for the current contract. This identifies the products and FOB points for which the contract is being established.

15   The Exhibit A report shows all detail added when the Item / FOB records is created. It is important in that it identifies the relationship between the Supply Chain Coordinator's item and the Supplier's item and also ensures that the information in the system is current and correct.

20   Figure **150** illustrates an Exhibit B button **15000**, which upon selection provides the detail on per case pricing and volume for each lane assigned to this Supplier.

The Exhibit B always retrieves the latest finalized matrix for each item. If the contract has not been linked or the relevant matrix finalized, they should be done prior to
25   generating this report.

In most cases, the contract term will correspond to the start and end dates of the linked matrix. However, if the contract will outlast the matrix, the screen **15100** of Figure **151** is presented. The various columns include:

30

- Cost Matrix End Date identifies the minimum term but will also mean that at the end of the matrix the contracted pricing will expire and a new Exhibit B should be generated and signed. (See Replacement Exhibit B)

- Contract End Date   assumes that the pricing will not change for the length of

5   the contract although the matrix suggests that this may not be true.

- No End date   essentially leaves it open-ended.

Since the Exhibit B will publish the term of the pricing, the choice of end date becomes very important.

10

In some cases, there may be a need to publish new pricing and volumes during the term of the contract. Selection of the Replacement Exhibit B menu item **15200** accommodates this process. See Figure **152**. The replacement Exhibit B differs from the standard Exhibit B only in that it provides a section at the end of the report for signatures.

15

Exhibit C, generated upon selecting the Exhibit C button **15300** of Figure **153**, lists product routing for each lane and any minimum order quantities if applicable, whether the product is sent in full truckloads, full truckloads with a minimum order quantity, less than truckload or for re-distribution.

20

Figure **154** is a flowchart of a process **15400** for creating a contract utilizing a supply chain graphical user interface in accordance with an embodiment of the present invention. A contract is identified utilizing a graphical user interface in operation **15402**. The contract is the associated with an item to be distributed utilizing the graphical user

25   interface in operation **15404**. The item is also prevented from being associated with more than one contract in operation **15406**.

In one aspect of the present invention, the contract may be identified utilizing a start date, an end date, an execution date, and payment terms. In one embodiment, the contract may

30   be generated by populating a template with information associated with the contract. In another aspect, items capable of being associated with the contract are displayed. In a

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further aspect, the contract may be identified and the contract associated with the item utilizing a network. In such an aspect, the network may include the Internet.

Bid Proposal Processing

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The proposal system has been designed to allow quick and easy creation of a generic proposal for any item(s) and supplier(s) within the Supply System. By centralizing the creation and storage of the data, an online record of all current and historical proposals is enabled. The proposal system is also tightly integrated with the Least Cost analysis

10   system.

The system is made up of two modules: data entry and reporting.

Data Entry allows a user to enter or select all information for generating a complete

15   proposal. Data Entry includes entering general proposal information (i.e. proposal name, buyer name, due date, contract begin date and end date), items, suppliers, restaurants served, usage information, selecting cost component templates, and updating Microsoft Word template documents. Most of the information above will be generated from data within the Supply System, but the system will allow the user to change some information

20   when necessary.

Reporting: After data has been entered, the proposal can be generated and printed. In the reporting module of the proposal process, a user can update specific documents for a supplier, print any of the reports included in the proposal, and/or generate the entire

25   proposal.

By following the flow of the tabs on the proposal window **d2900** (see Figure **d29**), the user will be guided through the proposal process. When enough data is entered to continue on to the next step in the proposal process more tabs will be enabled. For

30   example, when the user has completed entering information on the Main Info tab, the Items, Suppliers, DCs, and FOB Price tabs will become enabled.

The goal of the proposal system is to provide a way to generate a proposal in a more time efficient manner while at the same time centralizing the storage of proposals and allowing integration of the proposal with the Least Cost Analysis system.

5

A new Proposal can be created in either of two ways. The first and probably the most simple method is to build the proposal from scratch. Referring to Figure **155**, to create a proposal from scratch, select Proposal from the Supply menu. Then select Edit/New **15500** to open an existing Proposal or create a new proposal. After selecting the

10 Edit/New menu option, the standard query screen is presented. Select New on the standard query screen to begin generating the proposal.

The second method uses the "New Using Previous" feature of the present invention, which will create an entire copy of a previous proposal (not including any documents)

15 and allow the user to make any necessary modifications. To being the process, select the New Using Previous menu item **15502** to copy an existing Proposal into a new Proposal. Note that this feature is similar to the Cost Matrix feature of the same name.

Figure **156** illustrates a Bid Proposal Window **15600**. The Bid Proposal window is made

20 up of several different 'tabs'. These tabs are identified by the labels across the top of the window. Examples of the tabs are 'View Bid' **15602**, 'Items' **15604**, and 'Usage' **15606**.

The first tab visible on the Bid Proposal window when it is opened is the 'Main Info' tab **15608**. The 'Main Info' tab is where general information for this proposal is entered. The

25 main info tab on the Bid Proposal window shows general information, comments, and dates associated with this bid. Such information includes:

- Proposal ID: Unique identifier for this proposal. Generated by the Supply System, Noneditable, used for identification on specific reports and for retrieval

30 of proposals.

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- Proposal Name: Unique name for this proposal. It should be representative of the type of proposal the user is completing, and will be the primary method of identifying and retrieving the proposal later.

- Buyer Name: Name of buyer creating this proposal. Used to retrieve proposals by buyer.

- Proposal Due Date: Date that this proposal is due back to the Supply Chain Coordinator. Used on the proposal Cover Letter report.

- Contract Begin Date:. Date that contract associated with this proposal begins. Used on the proposal Cover Letter report, and used to determine contract length for usage calculations.

- Contract End Date: Date that contract associated with this proposal ends. Used on the proposal Cover Letter report, and used to determine the contract length for usage calculations.

- Actions: Actions are comments or activities associated with this proposal. A proposal can have an unlimited number of actions as long as each action has a date and text. To add, delete, or print actions use the buttons on the window's toolbar **15700**, shown in Figure **157**.

After entering all of the information on the 'Main Info' tab the user can move to the next tabs, 'Items', 'Suppliers', and 'DCs'. These tabs are where the creation of a proposal begins. Although these elements are added on three separate tabs in this description, the methods used to include them are consistent.

Figure **158** illustrates the page **15800** under the Items tab. As shown, the left side of the page under each tab is the search and selection area. It functions in the same manner as the rest of the Supply System, in that the user enters a search string and clicks search, and similar names to the search string will be retrieved. For example, as shown in Figure **159** which illustrates the page **15900** under the Items tab upon selection of the Search button, all Items beginning with "CUP-HOT" would be retrieved. After clicking on the 'Search' button, the present invention shows a list of Items matching 'CUP-HOT'.

These tabs are "Drag and Drop" enabled; the user can select any of the items found and by clicking on the relevant item and dragging it to the right, it is now included in the analysis. By the same token, dragging the selected item to the left will remove it from the proposal. The buttons between the search and selected areas can also can move the

5   selections. Button **15902** moves whatever has been highlighted on the left and includes it in the proposal. Button **15904** moves all items retrieved and includes them in the proposal. Button **15906** removes everything previously included in the proposal. Button **15908** removes only the highlighted selections from the proposal. Further, multi-select using CTRL+Click, and double clicking on any Item to move it are preferably also

10   supported.

After a search for the desired item(s) has been performed, another search can be performed by clicking the 'Query' button and entering new search criteria.

15   It is important to note that in order to include any of the elements in the proposal, they must have previously been entered in the Supply System. The Supplier selection tab retrieves all active and un-approved Suppliers that match the search criteria and have at least one active contact. Inactive elements should not appear as a relevant selection in any of the tabs.

20

Since the DCs are generally consistent between proposals, a complete list of all active DCs is retrieved and then the user simply selects the relevant one, or in most cases presses the button to move them all to the right.

25   When the user leaves any of the tabs for the first time, the new elements are propagated to all dependent tabs. For example, if a new Item is added, that implies new usage information.

Figure **160** illustrates a page **16000** under the FOB Price tab for selecting FOB price

30   component worksheets. As part of the proposal process Suppliers are asked to bid on FOB prices. The worksheets that are provided to the suppliers can vary depending on the

type of items included in the bid. There are several template FOB Price component worksheets in the system. A different worksheet may be associated to each item. For example, if a proposal involving mayonnaise were being prepared, the user would select the 'Mayonnaise Component' worksheet as shown in Figure **160**.

5

An association between a worksheet and each item must be generated before continuing to the next tab. Once all FOB price components are selected, the remaining tabs are enabled.

10   The selected worksheets can be printed along with the bid and can be viewed on the 'Template' tab. For more information on the 'FOB Price Component Worksheet' see the Reporting section of this document.

The Proposal mechanism for estimating usage functions in almost exactly the same

15   manner as in the Least Cost Analysis System. It is comprised of two tabs; the DC/Rest tab is used for estimating restaurant growth by DC, and the Usage tab to estimate same store or item growth. The values from the first tab are used in the Usage tab to determine the projected usage. For more information on general processing in these tabs see the section entitled Distribution Center Usage.

20

Figure **161** depicts a window **16100** for managing Distribution Center usage. Although the use of the DC/Rest and Usage tabs are almost identical there are a few differences and should be pointed out. Also, the tabs may look the same but the data stored here are used for different purposes in each process. The differences in the proposal system are

25   explained below. Usage information, Gross Weight and Item Cube can be used to determine if LTL sheets are printed and/or RDC's are included.

- Gross Weight   the approximate gross case weight of each item.
- Item Cube   the approximate case volume of each item.
30   - Projected Usage   Projected usage for the proposal contract period.

For example, if the two (2) week truckload weight estimate (two week usage x gross weight) is less than the system weight default (48,000 LBS) OR the two week volume estimate (two week usage x item cube) is less than system cube default (3000 CFT) for any DC, an LTL worksheet is generated and RDC records will appear on the Truckload

5 Freight Worksheet. The exact gross weight and cube will be requested on the Item Worksheet. Realize that the total gross weight for a truck is 45,000 lbs. LTL rates can be requested for any lane with less than 48,000 lbs. to avoid having to go back to the Supplier for additional rates. Optimal Product Routing in this example uses 43,500 lbs. gross weight of product, which accounts for pallet weight. For a detailed look at the

10 components and processing of the Usage Estimator, see the section of the same name.

Figure **162** is a flowchart of a process **16200** for creating a bid proposal utilizing a supply chain graphical user interface in accordance with an embodiment of the present invention. A graphical user interface is displayed in response to a request to create a bid

15 proposal in operation **16202**. Utilizing the graphical user interface, information is received in operation **16204** so that a bid proposal can then be generated using the information in operation **16206**. The received information may include a buyer name, a due date, a contract begin date, and/or a contract end date.

20 In one aspect of the present invention, the bid proposal may be generated utilizing templates. In another aspect, the information may be selected from a displayed list of available information. In a further aspect, items capable of being associated with the bid proposal may also be displayed. In such an aspect, the information may further include usage information associated with the items. In an additional aspect, the information may

25 be received utilizing a network.

Proposal Reporting

In order to create a proposal, the user first edits template documents and then selects

30 which reports will be included in the proposal. Figure **163** illustrates a Templates button **16300** which calls the Template window **16400** shown in Figure **164**.

The Proposal consists of two types of reports, Microsoft Word and Coordinator Supply. Microsoft Word reports are formatted and some are editable within Word whereas the Supply System reports are generated by the Supply System but are not editable. The

5   following is a list of reports available in the Proposal System and how they are generated.

The proposal system allows editing of a Microsoft Word template document which is then used to create the actual document that will be included in the proposal. Figure **165** illustrates a window **16500** displayed upon selection of the Templates tab. A drop down

10   list box **16502** shows which template documents can be edited. As shown in Figure **165,** the available templates include the Cover Letter and Price Component Worksheet. To start Microsoft Word and edit the selected template, the user double clicks on the document in the window.

15   Once Microsoft Word has started the user can edit the template document to fit his or her needs. The proposal Cover Letter will be used herein as an example in order to demonstrate how to use the template documents. The template bid cover letter is the basic cover letter used to create supplier-specific cover letters.

20   Only generic changes that apply to all suppliers should be made in the template. When the proposal is created, this document will be copied to all the suppliers and contacts associated with this proposal. The user will be able to edit a supplier specific cover letter later in the proposal process.

25   When editing of the cover letter ahs been completed, the document is saved by selecting **File, Update** from Microsoft Word's menus **16600,** as shown in Figure **166.** Now the user may return to the Supply System and continue with the proposal process.

Select **Update** to update the template

30   After the user has completed editing the templates, the proposal can be created.

270

Before creating the proposal, the user is allowed to select which reports should be included. Figure **167** is an illustration of the page **16700** presented upon selection of the Create Bid tab. To design/customize the appropriate proposal and select reports, the user checks or unchecks the appropriate boxes. When the user is satisfied with the selections

5   click the 'Create Bid' button **16800** on the toolbar. See Figure **168**.

The present invention then creates all of the documents needed to print this proposal. The user can view any of these reports by making the appropriate selections in the drop down list boxes **16900** shown in Figure **169**. The user also has ability to view any of the

10   proposal reports one at a time and for any specific supplier.

Printing

The proposal system allows a certain degree of flexibility when it comes to printing the proposal. The user can either print out one report for a specific supplier (the currently

15   selected report shown on the window) or print the entire proposal. When printing the entire proposal, the documents will be collated by supplier. Microsoft Word documents will be printed first for all suppliers followed by the Coordinator generated reports. The different printing mechanisms can be controlled by the buttons on the toolbar, shown in Figures **170** and **171**. For example, the Print button **17000** Prints the currently selected

20   report on the window. The Print Bid button **17100** prints the entire proposal.

This will print all of the reports that have been checked off on the Create Bid tab, only choose this option if the user is sure that he or she is ready to print the entire proposal. The proposal is now ready to be sent out. When proposals are returned, the information

25   can now easily be moved from the proposal process into the Least Cost Analysis.

Figure **172** is a flowchart of a process **17200** for proposal reporting utilizing a supply chain graphical user interface in accordance with an embodiment of the present invention. A proposal is identified in operation **17202** utilizing a graphical user interface.

30   A plurality of components of the proposal are then indicated utilizing the graphical user interface in operation **17204**. The selection of the components is subsequently allowed

utilizing the graphical user interface in operation **17206** so that a proposal can be created utilizing the selected components in operation **17208**.

In one aspect of the present invention, the proposal may be generated utilizing templates. In another aspect, the graphical user interface may be displayed utilizing a network browser. In a further aspect, the proposal may be editable. In an additional aspect, the proposal may be read-only. In yet another aspect, the proposal may include a bid proposal for goods to be shipped from a supplier to an outlet.

Creating a New Analysis

A Least Cost Analysis can be created in either of three ways. The first and probably the most cumbersome method requires building the analysis from scratch. The second method integrates the Bid proposal selections and creates the basis for a new analysis. Finally, the "New Using Previous" feature can be used, which will create an entire copy of a previous analysis version and allow the user to make any necessary modifications.

After selecting the Least Cost Toolbar button **17300** (see Figure **173**), the user is prompted with the standard query screen **17400**, shown in Figure **175**. The New button is selected. The details of the actual Analysis features are covered in a section below.

The New Using Previous option is selected from the menu **17500** shown in Figure **175**. Similar to the Cost Matrix feature of the same name, the user can make a complete copy of a previous Analysis version. However, unlike the Cost system there is no requirement that Analysis' dates cannot overlap.

Referring to the Bid Integration feature, since a lot of the information selected by the user in the Bid Proposal is also relevant to a Least Cost Analysis, the present invention provides the ability to integrate the Bid information in the analysis.

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To use the Bid Integration feature, the user selects the New option as above and the first column on the Analysis Tab will provide an alphabetical list of all Bid Proposals in the system. This will copy the Items, Distribution Centers, DC Usage and usage related information such as same store and restaurant growth estimates from the Bid. The user

5   can change the Bid selection or remove it by selecting "(None)" from the drop down list box **17600** shown in Figure **176**.

Figure **177** is a flowchart of a process **17700** for analysis creation utilizing a supply chain graphical user interface in accordance with an embodiment of the present invention. A

10   graphical user interface is utilized in operation **17702** to select between a plurality of options with each option corresponding to a separate technique of creating an analysis. A new analysis is generated upon the selection of a first of the options in operation **17704**. Upon the selection of a second of the options, a previous analysis is edited in operation **17706**. Also, upon the selection of a third of the options, a bid proposal is integrated with

15   an integrated analysis in operation **17708**.

In one aspect of the present invention, the selection may be received utilizing a network. In such an aspect, the network may include the Internet. In another aspect, the analysis may be a least cost analysis. In a further aspect, the analysis may be capable of being

20   accessed via a network-based interface.

Analysis Tab & Version Control

Figure **178** illustrates a window **17800** displayed upon beginning an analysis. The

25   information displayed in the window includes:

- Analysis Name: The name that identifies the analysis in the system.
- Analysis ID: Unique identifier assigned by the system.
- Buyer: The buyer responsible for this analysis.

30   - Period of Agreement: The dates that cover the range of the analysis. The dates are used to calculate usage estimates if required, and ultimately to create the Cost Matrix.

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- Unit of Measure   The units that pricing, plant capacities etc., will be entered.

Figure **179** depicts an option selection window **17900**. Each of the following options can be changed by analysis version:

- Version Name: The name that uniquely identifies each run of the analysis. Version Control is handled in more detail later in this section.

- ..max # of FOBs..:   By changing this option, either a single source (One FOB per DC) or a multi-source problem is run. Everything other than "One FOB" is considered multi-source with available selections from two to five FOBs and unlimited.

- ..pricing method..:   The present invention supports three types of pricing, FOB, FOB + Freight and Delivered. Each version can have a different pricing method. Pricing is covered in detail in the section entitled Pricing.

- ..Upcharge(Downcharge)..:   Any adjustment positive or negative that should be made to the Invoice FOB calculated by the system.

- ..RDC Truckload Validation..: Ignores the fact that the total usage on winning OPR lanes for an FOB may not be enough to warrant RDC routing.

- Solution Strategy   For very difficult problems,, the present invention provides an alternate strategy which a user can choose to determine the least cost. Generally, for problems that are taking fifteen minutes or more, this strategy is recommended. It will arrive at the same answer as the standard strategy but in a much shorter time. Since most of the solutions determined by the solver are returned in seconds the "Cuts" strategy would actually add unnecessary overhead for simple problems.

When the analysis tab is selected, the version button **18000**, shown in Figure **180**, is displayed on the toolbar. Unlimited versions of an analysis can be created simply by pressing the button. Figure **181** illustrates a verification window **18100** that appears upon selection of the version button.

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The name assigned to the new version should be representative of the variance being tested in order to easily differentiate between versions later. A discussion of the methods provided for completing version comparisons is presented in the section entitled Solving and reviewing the Solution.

5

Items, FOB, DCs and Usage information are not considered to be version dependent, and hence this information cannot be changed once a second version of an Analysis has been created. However, a variety of methods of excluding this information from consideration between versions is provided by the present invention.

10

Figure **182** is a flowchart of a process **18200** for analysis version control in a supply chain management framework in accordance with an embodiment of the present invention. A plurality of separate versions of an analysis are maintained in a database in operation **18202**. A request for an additional version of the analysis is received utilizing a graphical user interface in operation **18204**. In response to the request, the additional version of the analysis is generated in operation **18206**. A plurality of parameters of the additional version are allowed to be changed utilizing the graphical user interface in operation **18208**. The parameters that are allowed to be changed include: a maximum number of supplier sources, a pricing method, and/or an invoice adjustment.

15

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In one aspect of the present invention, the additional version of the analysis may be named in accordance with a variance associated with the additional version. In another aspect, the request may include the selection of an icon on the graphical user interface. In a further aspect, the analysis may be a least cost analysis. In an additional aspect, the request may be received utilizing a network. In yet another aspect, the parameters of the additional version may be capable of being changed utilizing a plurality of fields on the graphical user interface.

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Adding Items, FOBs and DCs

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Although Items, FOBs and DCs are added on three separate tabs in the Analysis, the methods used to include them are consistent. Figure **183** depicts a tab page **18300** for adding and removing FOBs from an analysis.

5   The left side of each tab is the search and selection area. It functions in the same manner as the rest of the system, in that a search string is entered and a search button is selected, and similar names to the search string will be retrieved. For example, in the case shown in Figure d53, all FOBs beginning with "DOP" would be retrieved.

10   These tabs are "Drag and Drop" enabled, allowing selection of any of the matches found and by clicking on the relevant match and dragging it to the right, it is now included in the analysis. The buttons **18302** between the search and selected areas can also move the selections, similar to the manner discussed above with reference to Figure **183**. Multi-select using CTRL+CLICK and double clicking on any Item to move it, are also

15   supported. It is important to note that in order to include any of the elements in the analysis, they must have previously been added to the system.

The FOB selection tab retrieves all active and un-approved FOBs that match the search criteria. Inactive elements will never appear as a relevant selection in any of the tabs.

20
Since the DCs are generally consistent between each analysis, a complete list of all active DCs is retrieved by default and the user selects the relevant DCs or in most cases presses the button to move them to the right.

25   As shown in Figure 184, which illustrates a portion of the Item tab page **18400**, the Item tab has an additional editable column **18402** for the Item conversion factor.

- Conv. Factor: If the analysis is using units other than cases, the present invention converts any input data to the relevant lowest common denominator. For

30   example, if pounds are being used and there were 36 lbs. of a product in a case,

the conversion factor would be 36. The default is always one (1), since the large majority of analyses will be in cases.

When leaving either of the tabs for the first time, the system propagates the new elements to all dependent tabs. For example, if a new FOB is added, that implies new pricing, lanes, capacity etc. will also be added and the relevant tabs for each information group are updated.

Figure **185** is a flowchart of a process **18500** for editing supplier information in a supply chain management framework in accordance with an embodiment of the present invention. A graphical user interface is displayed that indicates a plurality of items in operation **18502**. The selection of one of the items is allowed utilizing the graphical user interface in operation **18504**. In response to the selection, a supplier associated with the item is depicted in operation **18506**. A plurality of parameters of the supplier are also allowed to be changed in operation **18508** utilizing the graphical user interface.

In one aspect of the present invention, the selected parameters may include a case cube, cases per truckload, and/or a gross weight. In another aspect, the changes to the parameters may be updated in a database. In such an aspect, the changes to the parameters may be updated utilizing a network. In one aspect, the network may include the Internet. Additionally, the changes to the parameters may be updated in response to the selection of an icon of the graphical user interface.

Item FOB Information

Figure **186** illustrates a page **18600** that is displayed upon selection of the Item/FOB tab. As part of the Bid proposal process, the information that has been entered for each Item FOB combination in the system is provided to the Suppliers for correction and/or additions. The Item/FOB tab in the analysis is provided for entry of any changes that they may have made. Even if the analysis is not based on a Bid, some of the information on this tab is crucial to the solver process.

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- Case Cube: the actual case cube or volume. It is used in the calculation of the per case two week cube on a lane (item cube x two week usage), which is required both by the optimal product routing (OPR) process and in determining which lanes have potential for LTL or RDC shipments. A detailed explanation of OPR process is provided in the section entitled Optimal Product Routing, below.

- Cases per Truckload: All freight rates requested by the Bid are truckload rates. Since the majority of analyses are performed in cases, cases per truckload may be used to determine the case freight.

- Gross Weight: the actual gross case weight. It is used in the calculation of the per pound two week usage on a lane (gross weight x two week usage), which is required both by the optimal product routing (OPR) process and in determining which lanes have potential for LTL or RDC shipments. A detailed explanation of OPR process is provided in the section entitled Optimal Product Routing, below.

The remaining information is also important, however it is not a factor in determining a Least Cost solution. It is stored separately from the Item / FOB Cost information so that cases per truckload or case weights can be used without effecting the data that is currently considered production.

At the point, the analysis has been completed and a version that will become the production model has been selected. The Cost information is updated by selecting the Update button **18700** on the toolbar. See Figure **187**.

Select the Update button and the present invention creates any Item FOB combinations that do not exist in the Cost system and update any existing combinations with the information the user may have entered to complete the analysis.

Figure **188** is a flowchart of a process **18800** for adding components in a supply chain management analysis in accordance with an embodiment of the present invention. A query is entered in a search field of a graphical user interface for searching for a plurality

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of supply chain components in operation **18802**. Results of the search are listed in a results field of the graphical user interface in operation **18804**. The results are then selected from the results field for inclusion in a supply chain analysis in operation **18806**.

5   In one aspect of the present invention, the selected supply chain components may include supplier sites, distributor sites, and/or items. In another aspect, the results may be selected for inclusion in the supply chain analysis utilizing icons. In such an aspect, the results may also be selected one at a time for inclusion in the supply chain analysis utilizing a first icon. The results may also be selected all at once for inclusion in the

10   supply chain analysis utilizing a second icon. In a further aspect, the supply chain components may include items while the graphical user interface includes a field for entry of a conversion factor. In an additional aspect, the results may be selected for inclusion in the supply chain analysis utilizing a drag and drop feature.

15   **Capacity & Excluding FOBs**

The system supports capacity constraints at two levels. Both FOB minimum requirements and capacities can be set. They can also be set at the Supplier level.

20   Figure **189** is an illustration of an exemplary analysis window **18900** displayed upon selecting a Capacity tab. For example, in this analysis, two levels of capacity constraints have been added for Lamb-Weston Inc. As a Supplier, Lamb must get at least 200 million pounds of product independent of any further requirement at the FOB level. Both the Pacso, WA and American Fall, ID FOB points have minimum requirements of 90

25   million and maximum capacities of 110 million. The remaining FOB in Richland, WA has essentially no minimum, but a 55 million capacity. Although the sum of the plant minimums is less than the Supplier minimum, the solver will allocate business to match the Supplier constraint while still ensuring that each FOB constraint is matched. Naturally, the sum of the plant maximums cannot be less than a Supplier minimum.

30

As mentioned above, once a second version of an analysis has been created, it is not possible to remove Items, FOBs or DCs. However, a Supplier or individual FOB points can be excluded on the Capacity tab.

5   Figure **190** illustrates another analysis window **19000**. In this example, two of McCain Foods FOB points have been excluded from this version of the analysis. The solver will not be passed the FOB points or any related information such as lanes, pricing etc. If the "Include" has been changed to "no" at the Supplier level, all the FOB points would be automatically excluded.

10

Figure **191** is a flowchart of a process **19100** for managing supplier sites in a supply chain management framework in accordance with an embodiment of the present invention. A plurality of supplier sites are displayed utilizing a graphical user interface in operation **19102**. A minimum value and a maximum value of capacity levels associated with the

15   supplier sites are determined utilizing the graphical user interface in operation **19104**. The supplier sites are conditionally excluded from a supply chain analysis utilizing the graphical user interface in operation **19106**.

In one aspect of the present invention, terms of a contract associated with the supplier

20   sites may also be identified utilizing the graphical user interface. In another aspect, the supplier sites may be conditionally excluded utilizing a toggle button. In a further aspect, the supplier sites may be conditionally excluded separately for different versions. In an additional aspect, the minimum value and the maximum value of the capacity levels may be determined utilizing a network. In such an aspect, the minimum value and the

25   maximum value of the capacity levels may also be determined utilizing TCP/IP protocol.

Pricing

On the analysis tab, the option of selecting the pricing method being for this analysis

30   version is presented. Depending on the selection previously made, the Price tab will be

used for FOB or FOB & Freight pricing or the Price Dlvd tab for delivered pricing. The present invention also provides the ability to factor volume pricing into the analysis.

Figure **192** is a depiction of an FOB pricing window **19200**. In the simplest of cases, a price (Contract FOB) will have been negotiated for each Item and FOB combination in the analysis. Since the solver is passed a basket (weighted average across all items in the analysis) price for each lane, no price field can be left blank. In the example shown in Figure **192**, bulk mayonnaise has a price of $8.42 from the Hudson Industries Troy, Al plant and bulk tartar sauce is priced at $9.23.

Two forms of volume based pricing are supported in the Least Cost system: Supplier volume and FOB volume. They are mutually exclusive in that by version there can be only one type of pricing.

Figure **193** depicts an illustrative FOB Volume Pricing screen **19300**. In this example, American Food Service offers two volume pricing discounts at their FOB point. Any volume awarded to them from 0 to 2,090,000 pounds has a price of $1.0026/pound. If they are awarded volume between 2,090,000 and 2,508,000 that price drops for all volume to $1.0016/pound. For any volume over 2,508,000 pounds the price drops to $1.0010/pound. As the solver is deciding the optimal distribution model, if their FOB is awarded volume over any of the breakpoints it will grab the lower price and keep solving until the least cost is determined. The new price applies to all volume awarded from that FOB point.

In many cases the Suppliers may not be as concerned about the volume awarded to each individual FOB point as to the overall volume awarded across all their FOB points.

Figure **194** depicts a Supplier Volume Pricing window **19400**. In the pricing scheme shown in Figure **194**, Ventura has negotiated a Supplier volume pricing breakpoint. For any volume awarded between 0 and 999,999 cases the price for bulk mayonnaise will be $8.94 and $9.51/case for bulk tartar from Chambersburg and $9.12 and $9.58/case from

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City of Industry. If the combined volume across both of their FOB points exceeds 100,000 cases, the price drops to $8.84 and $9.41/case from Chambersburg and $9.02 and $9.48 from City of Industry. This price reduction is independent of the allocation to either FOB point as long as the overall award exceeds the Supplier volume breakpoint.

5 The new price applies to all volume awarded.

It is also possible to have the new solver determine the Least Cost when the pricing is quoted on a delivered basis. Once a pricing method of "Delivered" is selected on the analysis tab the Price Dlvd tab is enabled. Figure **195** shows a Delivered Pricing screen

10 **19500**.

Pricing is entered in the same manner as FOB pricing, and as in FOB pricing, the user must provide a price for all Items on a lane if at least one price is entered. Lanes can be excluded simply by providing no prices for those lanes.

15

Figure **196** is a flowchart of a process **19600** for pricing in a supply chain management framework in accordance with an embodiment of the present invention. A selection of at least one of a plurality of types of pricing schemes is received utilizing a graphical user interface in operation **19602**. Utilizing the graphical user interface, a plurality of supplier

20 sites are then displayed in operation **19604**. At least one of a plurality of pricing fields are depicted adjacent the supplier sites based on the selection utilizing the graphical user interface in operation **19606**.

In one aspect of the present invention, the received pricing schemes may include at least

25 one of supplier site pricing, volume pricing, and/or delivered pricing. In another aspect, the received pricing schemes may include all of supplier site pricing, volume pricing, and delivered pricing. In a further aspect, pricing information entered in the pricing fields may be utilized in a supply chain analysis. In an additional aspect, the selection may be received utilizing a network. In even another aspect, the selection may be received

30 utilizing an icon of the graphical user interface.

Distribution Center Usage

The Least Cost mechanism for estimating usage functions operates in the same manner as in the Bid System. It is comprised of two tabs, the DC/Rest tab is used for estimating

5   restaurant growth by DC, and the Usage tab to estimate same store or item growth. The values from the first tab are used in the Usage tab to determine the projected usage. A more detailed explanation of the usage calculations is included in the section entitled Usage Estimator, below.

10   Figure **197** is a depiction of a Projected Restaurant Growth screen **19700**. The present invention provides the ability to estimate restaurant growth at two levels. First, by entering a percentage in the 'Total Rest. Growth Amount' **19702**, the value will be copied and applied to all of the restaurant growth percentages at each DC. In the example shown in Figure **197**, 5.00% was entered and propagated to each DC. The default value can also

15   be overridden and data entered directly for each individual DC. Several of the fields are described below.

- Total Rest. Growth Amount   Any value entered will be applied uniformly across all DCs in the current analysis.
20   - Restaurant Growth %   The user can override the overall amount at each DC simply by entering an alternate estimate percentage.
- Projected Avg. Rest. Count   Based on the percentages entered, a projected restaurant count is calculated. The user also has the ability to enter values directly simply by entering an alternate value in the relevant cell. The projected restaurant
25   will be carried over to the 'Usage' tab and will affect the DC's projected usage.

Figure **198** illustrates a Projected Usage Estimation screen **19800**. Several fields of the screen are described below. The projected usage for each DC is calculated based on projected restaurants served, data retrieved from Coordinator Link data and DC/Item

30   Growth (same store growth). This projected usage number will be used by the solver for capacity information and also in output reports.

- Item Growth %   For each Item in the analysis, the user can enter an overall estimate for same store or item growth. As in the restaurant growth tab this value will be applied uniformly across all DCs.

5
- Usage Period   Contract period for this analysis. Used to calculate the length of the contract in order to determine previous and projected usage.

- Previous Usage   Previous Usage is the sales by cases reported to the Supply Chain Coordinator by each DC through the system Link. These sales are based on a time period that is in conjunction with the 'Usage Period'. This period

10   is computed by taking the most recent date which the Supply Chain Coordinator has received data from all of the DCs and using it as the usage end date. The usage begin date is then computed by going backwards for the length of the proposed contract. For example, in the situation shown in Figure 198, the length of the contract is 1 year. If the most recent date that all DC data had been received

15   was 3/1/01 then the previous usage period would be 4/1/00 to 3/1/01. This would provide a previous usage for the most recent twelve month period in the system.

- Projected Rest. Count The projected restaurant count is the number of restaurants that will be served by a DC for the period of the proposed contract. This number is copied from the DC/Rest tab.

20
- Coverage Factor %   The coverage factor percentage is a number devised to correctly calculate the DC's projected usage. Coverage Factor is the percent of total restaurants that this DC has served this product to over the past year. For example, if a DC serves 200 restaurants in one month but only sells this item to 100 of those restaurants then the coverage factor would be 50%. If the item was

25   sold to all 200 restaurants then the coverage factor would be 100%.

- Avg. # RM   Average number of restaurant months. This figure represents the average number of units sold to a restaurant for this item for any given month. This average is a 12 month rolling average calculated based on the data reported to the Supply Chain Coordinator by the DCs.

30
- DC/Item Growth   At the DC level, the user can override the overall growth % by entering an alternate value for the relevant DC.

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- Projected Usage   The actual usage estimate for each Item / DC combination. Initially the projected usage will be calculated based on the following formula:

(Projected Rest. Count * Avg. # RM * Coverage Factor % * DC/Item Growth *

5   Number of Months in Contract)

By editing the DC/Item Growth percentage (or overall Item Growth %), the projected usage can be manipulated to the desired level. The user can also directly edit the projected usage amount which will adjust the DC/Item Growth amount accordingly.

10   Usage estimates calculated by the system are always in cases; hence if the user is entering pricing, volume or capacity constraints in any other unit, these values should be modified appropriately.

Note that the previous usage amount is not used in the calculation of the projected usage

15   amount. It is used as a guide only. In the example shown in Figure **198**, no overall Item growth percentage was used, but chicken patty's were projected to grow by 4.00% at the Ameriserve in Omaha and 5.00% at the Ameriserve in Plymouth.

Figure **199** is a flowchart of a process **19900** for projecting distribution center usage in a

20   supply chain management framework in accordance with an embodiment of the present invention. A plurality of supply chain distributors are displayed utilizing a graphical user interface in operation **19902**. The entry of a growth value is allowed in operation **19904** utilizing the graphical user interface so that a projected parameter amount associated with the supply chain distributors can then be calculated based on the growth value in

25   operation **19906**.

In one aspect of the present invention, the growth value may include a restaurant growth percentage. As a further aspect, the projected parameter amount may include a projected restaurant count. In another aspect, the growth value may include an item growth

30   percentage. In a further aspect, the projected parameter amount may include a projected

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item usage amount. In an additional aspect, the projected parameter includes an editable default value.

Lane Restrictions

In the Least Cost system, the ability is provided to override any solution that the solver determines and force certain lanes. The overrides can be established before the solver runs.

It also a good habit to run a least cost version without any lane restrictions, so that an estimation of the relative cost of forcing or excluding lanes can be readily determined.

Figure **200** illustrates an Excluding Lanes screen **20000** displayed upon selection of a Lane Restrict tab. In an earlier section, a description of excluding Suppliers and/or FOB points using the "Include" indicator was set forth. This is related to the Lane Restrict tab in that if an FOB point is excluded from an analysis version, the lanes are automatically excluded from that FOB point to each DC. In the example shown in Figure **200**, Cavendish Farms was excluded; hence all lanes from that FOB are marked as excluded. The solver will never receive these lanes as potential choices when determining the least cost. It is also possible to exclude individual lanes from this tab. However, the user cannot include a lane if the FOB point has been excluded on the Capacity tab.

It may also be necessary to ensure that certain lanes are forced regardless of whether the lane assignment will prevent the least cost from begin achieved. Figure **201** is a depiction of a Forcing Lanes window **20100**.

In this example, the "Required" option has been selected for the lane from J.R. Simplots Hermiston FOB to Post Albuquerque. The solver will allocate this lane prior to beginning its optimization calculations, hence ensuring that the remaining lane allocations will still minimize the total cost given the lane requirement.

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In a multi-source problem, lanes can still be forced, although without adjusting the supporting input the FOB may also receive another DC. For example, if a user wishes a lane to be forced but not allow the relevant FOB to get another DC, the user can simply make the FOB's maximum the DC's usage.

If the product is being single sourced (1 FOB : 1DC), a lane cannot be forced twice. For example if a user attempted to also force the Lamb FOB to Post Albuquerque, the message screen **20200** shown in Figure **202** would get the following message.

The third Lane Restriction option is marked as Solver in the previous example, and simply means that the lane is available to the solver as a potential lane in the least cost solution.

The Honor TL Rate boxes **20002** (Figure **200**) are used to specify whether or not the Supplier will Honor Truckload (TL) rates for shipments that are not a Full Truckload. See the section below entitled Optimal Product Routing.

Figure **203** is a flowchart of a process **20300** for restricting lanes in a supply chain management framework in accordance with an embodiment of the present invention. A plurality of distribution centers of a supply chain are displayed utilizing a graphical user interface in operation **20302**. A lane restriction of each of the distribution centers is then designated utilizing the graphical user interface in operation **20304**. The distribution centers are then conditionally involved in a supply chain analysis based on the designation in operation **20306**.

In one aspect of the present invention, it may be determined whether a supplier site has been excluded from the supply chain analysis so that the lane is involved in the supply chain analysis based on the determination. In another aspect, the lane may be allocated prior to the supply chain analysis upon the lane restriction of the distribution centers being designated as required. In a further aspect, the lane may be excluded during the supply chain analysis upon the lane restriction of the distribution centers being designated

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as excluded. In event another aspect, the lane may be included during the supply chain analysis upon the lane restriction of the distribution centers being designated as to be solved. In an additional aspect, the designation may be received utilizing a network.

Freight

Freight quotes in the least cost system can either be Truckload or LTL.

Figure **204** is an illustration of a Truckload Freight window **20400** displayed upon selection of a TL Freight tab. For each DC and FOB in the analysis, an input area **20402** is provided for the Truckload Freight amount. Freight is assumed to be consistent across all items in the analysis. Prior to the solver run, the TL freight amount is converted to a case and/or unit freight rate using the Item/FOB tab cases per truckload, and the Item tab conversion factor. If the usage estimates entered suggest that an RDC rate may be applicable on any of the lanes, a lane from the FOB is automatically added to the relevant RDC to this tab.

- Lane Distance: This amount is used in estimating freight competitiveness between the Supplier quote and internal estimates. The present invention automatically populates this column from the Supply System.

Note that omitting a rate for a lane has the same effect as excluding the lane.

Figure **205** illustrates an LTL Freight page **20500**. The Bid system automatically generates an LTL worksheet if it determines that certain lanes have the potential to order LTL.. Based on the Usage estimates entered or calculated by the system and the gross weight or cube per case entered on the Item/FOB tab, an identification is made as to which lanes have the potential to order LTL and lanes on the LTL Freight Tab are automatically populated.

In the example shown in Figure **205**, O.K. Foods has quoted LTL rates from their Fort Smith FOB to ProSource Atlanta and Burlington. All quotes are in $CWT (hundred weight), hence the Atlanta rate is $165 ($1.10 * 150) and the Burlington rate is $400 (The LTL minimum of $400 is not satisfied by the quoted rate of $180 (150 * 1.2)). The Optimal Product Routing (OPR) process will determine which rate to use based on its estimates of two week usage and compare the basket cost with both TL and RDC rates to determine the optimal routing. The entire OPR is discussed in detail in the section below entitled Optimal Product Routing.

Preferably, as projected usage estimates are adjusted on the Usage tab, rows will be added and deleted to this tab when relevant.

Figure **206** is a flowchart of a process **20600** for managing freight in a supply chain management framework in accordance with an embodiment of the present invention. A graphical user interface is utilized to display a plurality of distribution centers of a supply chain in operation **20602**. Next, in operation **20604**, a truckload freight value is received in an input field of the graphical user interface. The truckload freight value is converted in operation **20606** so that a supply chain analysis can then be performed using the converted truckload freight value in operation **20608**.

In one aspect of the present invention, a suggested value may be displayed in an output field. In an additional aspect, the suggested value may be received from a supply chain manager utilizing a network. In another aspect, the truckload freight value may be converted to a case value. In a further aspect, the truckload freight value may be converted to a freight rate value. In an additional aspect, the truckload freight value may be received utilizing a network.

Regional Restrictions

Figure **207** depicts a restriction window **20700**. The present invention provides the ability to force DCs in a region to be awarded the same FOB point. In the example

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shown in Figure **207**, a region is established to combine McCabe's DC in Portland and Restaurants North West DC in Alaska. By selecting the Force FOB option to "Yes", the solver will ensure that both DCs receive the same FOB point.

5   Figure **208** is a flowchart of a process **20800** for imposing regional restrictions in a supply chain management framework in accordance with an embodiment of the present invention. A plurality of distribution centers of a supply chain are displayed utilizing a graphical user interface in operation **20802**. A free on board (FOB) point associated with a region in which the distribution centers reside is identified in operation **20804**. The

10   distribution centers are then forced to use the FOB in response to a user action utilizing the graphical user interface in operation **20806**.

In one aspect of the present invention, the user action includes the selection of an icon. In another aspect, the region may be user-defined. In a further aspect, a site role of each

15   of the distribution centers may also be displayed utilizing the graphical user interface. In even another aspect, the graphical user interface may be displayed utilizing a network. In an additional aspect, the graphical user interface may be a browser-based interface.

Optimal Product Routing

20

One of the major features in the least cost system is the Optimal Product Routing (OPR) feature. Because the present invention can factor Truckload, RDC and LTL lanes into the least cost analysis, the OPR engine will automatically determine the optimal routing prior to passing the data to the solver. OPR is automatically run prior to running the solver,

25   but can also be run at any time using the Routing button **20900** on the toolbar. The Routing button is shown in Figure **209**.

Optimal Product Routing is the process of determining for each lane in an analysis, the lowest cost routing (Full Truckload [TL], LTL, RDC) for the Market Basket of Product.

30   The capability is built directly into the Least Cost system.

OPR processing includes determining two-week usage as well as determining available routing information.

Regarding two-week usage, the weight and cube of product shipped during a two-week
5   period determines the possible routing types. Lanes with either a two-week weight of more than the amount specified in the analysis (typically 43,500 lbs.), and a two-week cube of more than 3,000 Cubic Feet will only travel TL. Those with less (non-truckload) may also travel LTL, and in the case of Dry product, may also travel RDC. Two-week weight usage is determined for all lanes included in the current version of the analysis.
10

When determining available routing information, OPR finds the TL, LTL, and RDC information available for each lane and identifies incomplete or missing Freight information. It is important to gather freight quotes on all applicable routing types. For example, a Supplier may only quote an LTL or RDC freight for a non-truckload lane, yet
15   due to the nature of the load it may cost less to ship the product with a standard truckload rate.

OPR operates under the following assumptions:

20   • Truckload   There must be a TL freight amount. Even if available, LTL and RDC rates are not considered.

      • Non-Truckload   Any TL or acceptable LTL routing freight amount will suffice, yet quotes for all routing types are strongly recommended.

      • Honor Truckload (TL) Rate   For lanes that are not a Full Truckload, it is
25   important to distinguish whether or not the Supplier will Honor Truckload (TL) rates. This is specified for each lane in the Lane Restrictions tab.

Consider a lane which costs $1,000 to ship for a product which normally has 1,000 Cases per Truckload. Please refer to Table 29, below. If usage warranted a Full Truckload, the
30   freight per case would be $1 (#1)

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Now assume that the two-week usage for this lane is only 500 cases. The $1,000 Supplier quote may imply either of the following:

- *Example #2.* The $1,000 rate is the price to ship the lane, whether it is 5 or 500
5   cases ($1,000 / 500 = $2 per case).

- *Example #3.* Since the Supplier ships other products to the DC (e.g. other BKC products, products from, other concepts) he assumes that all of his trucks will ship full. The Supplier therefore Honors the TL rates, and even though the two-week usage is only 500 cases, charges a per case freight as if the usage warranted
10   a Full Truckload ($1,000 / 1,000 = $1 per case). In this case, it may be useful to choose Honor TL rates on the *Lane Restrictions* tab of the Least Cost system.

Table 29

#	Type	Truck Frt	CS / Truck	2-week Usage	Freight / Case	Explanation
1	TL	$1,000	1,000	1,000	$ 1.00	Frt / CS per Truck
2	TLMIN	$1,000	1,000	500	$ 2.00	Frt / Usage
3	HonorTL	$1,000	1,000	500	$ 1.00	Frt / CS per Truck

15

The status of Lane Freight information can be either Complete, Incomplete, or Optional:

- Complete   All relevant Freight information is available. OPR can continue.
20
  o Truckload shipments with Truckload rates
  o Non-Truckload, Dry shipments with TL, valid LTL, and RDC rates
  o Non-Truckload, Refrigerated shipments with TL and LTL rates

- Incomplete   Mandatory Freight information is missing. OPR cannot
25   continue.

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o Non-Truckload shipments with only an LTL Minimum rate provided (e.g. an LTL Minimum is provided, without specific weight class rates)

o Non-Truckload shipments with LTL rates provided without an appropriate LTL Minimum

5

o Non-Truckload shipments with LTL rates provided only for higher weight classes (e.g. A Supplier only provides a 10,001 - 20,000 lbs. rate for a lane with a 5,000 lb. Usage. This weight will never be satisfied.)

- Optional   Requested (not mandatory) Freight info is missing. OPR

10   can continue.

o Non-Truckload shipments with some, but not all of the applicable quotes (e.g. Dry shipments consider RDC rates, Refrigerated/Frozen do not)

o Non-Truckload shipments with LTL rates provided for weight classes below the appropriate usage (e.g. A Supplier only provides a 10,001 -

15   20,000 LBS. rate for a lane with a 22,000 lb. usage.)

In order to ensure the lowest pricing, Logistics recommends requesting all relevant freight information from Suppliers. OPR will not continue if any lanes are Incomplete. OPR can, however, at user request, continue even though the status of certain lanes are

20   Optional. Realize however, that not requesting freight quotes on all applicable routing types may actually inadvertently place a Supplier at a competitive disadvantage. The Supply Chain Coordinator may award business based on Landed Cost, which includes freight. Performing a Least Cost analysis with missing freight information may yield inappropriate lane awards.

25

This information is available on the 'Solution Tab' of the Least Cost analysis under 'Optimal Product Routing Reports'. More information on these reports can be found in the following section.

30   The Least Cost system operates on a Market Basket concept for determining per case/unit and total shipment cost for all routings. It considers all Items shipping on a particular lane

in the relevant Unit (Case, Pound, Ounces) on which the analysis is based. For all routing types provided, OPR determines the Total Shipment amount for the entire usage specified, and the Unit Shipment amount required to ship a Unit of product.

5   Shipment Cost is calculated as follows:

- TL   Product is shipped based on a Full Truckload freight quote. The Unit Shipment Cost is the Full Truckload cost / Units Per Truckload.

- TLMIN   For shipments smaller than a Full Truckload, it may prove more cost effective to ship the Product via the quoted TL rate. This routing is referred

10   to as a Truckload Min, whereby the shipment has a TL quoted freight with a Minimum Order Quantity (MOQ) specified. The Unit Shipment Cost is the Full Truckload cost / Usage, except in the case of *Honor TL Rate*, where it is the Full Truckload Cost / Units Per Truckload.

- LTL   Product is shipped via an LTL carrier, that specializes in partial shipments.

15   The shipment cost is based on a price per hundred weight, and possibly an overall minimum amount for the entire shipment. An LTL Minimum must be provided along with any LTL information. The Unit Shipment Cost is the Total LTL Shipment Cost / Usage.

- RDC   For Dry Products only (excluding Alaska and Hawaii RDC's), the Product

20   is shipped via the appropriate Re-Distribution Center (Prosource or Chicago Consolidated RDC). Unit Shipment cost includes Inbound freight to the appropriate RDC, the RDC markup, and Outbound freight to the DC. When a product is shipped RDC, all shipment amounts assume Full Truckloads.

25   Optimal Product Routing takes into account all of the available freight routing information and determines the lowest cost method of shipping the Market Basket of product for each lane. In the event of multiple routing types having identical shipment costs, OPR is decided in the following order of preference: TL, TLMIN, LTL, and RDC (Dry shipments only).

30

Winning routing types are chosen on a lane-by-lane basis. When considering all lanes, however, this may not always be feasible. Certain lanes may be considered an RDC Override, and Optimal Product Routing will determine the best routing excluding the RDC rates for these lanes. Presented below are two examples of this:

- **Insufficient Usage** - This occurs when the total usage is not sufficient to warrant a Full Truckload from the FOB to the respective RDC. For example, assume that OPR determined that FOB1 shall service DC1 and DC2 via the RDC, each with a respective usage weight of 10,000 lbs. The total usage from FOB1 to the RDC (20,000) is not sufficient to fill a truck.

- **Infeasible Coverage** - This occurs when based on the winning load types for each lane a situation exists in which not all DC's can be serviced regardless of which FOB wins the RDC. This scenario is due to a rule that only one FOB can service an RDC for a particular product. For example, consider the following example in which two FOB's each bid on separate Prosource DC's.

Table 30

FOB	LOAD TYPE	DC 1	DC 2	DC 3	DC 4
FOB 1	RDC	Yes	Yes		
FOB 2	RDC			Yes	Yes

Note that the above is not feasible. There is no FOB that can service all of the DC's via the Prosource RDC.

Table 31

FOB	LOAD TYPE	DC 1	DC 2	DC 3	DC 4
FOB 1	RDC	Yes	Yes		
FOB 2	RDC			Yes	Yes
FOB 3	LTL	Yes	Yes		

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In this example, however, it is feasible for FOB 2 to win the RDC, with DC 1 and DC 2 being serviced by FOB 3.

5   As with the Least Cost Analysis, OPR is calculated on a per Unit basis. As a last step, OPR populates a case freight table which is used to create Cost Matrices once an analysis is complete. All of this information is kept in the system for enhanced analysis by the Logistics department.

10   Figure **210** illustrates a Report Selection window **21000**. Several of the reports that can be selected are set forth below.

- Freight Information Provided: At a Market Basket Level, contains Lane Freight Status, 2-week totals (Cases, Weight, Cube) and Freight Provided information for
15   each lane.

- LTL Routing Grid By Lane: Displays all LTL information provided with shading to identify missing rates.

20   - Routing Results by Lane: At a Market Basket Level, contains Truckload and Unit Shipment amounts for each of the Load Types provided (TL, LTL, RDC), along with an indication of the Load Types chosen as the Optimal Product Routing winner.

25   - Routing Results by Lane, Item: At an actual Item level, contains Truckload and Unit Shipment amounts for the Load Types chosen for its lowest cost. This Shipment information is used to create Cost Matrices.

- Routing Results w/ RDC Breakout by Lane: A breakout of the RDC information
30   provided in the *Routing Results by Lane*, detailing the Inbound, Markup, and Outbound freight amounts.

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- Routing Results w/ RDC Breakout by Lane, Item: A breakout of the RDC information provided in the *Routing Results by Lane, Item*, detailing the Inbound, Markup, and Outbound freight amounts.

5

- TL Freight Variance Analysis: Compares Truckload Freight rates against Freight Per Mile benchmarks.

- TL Freight Variance Analysis, by Case: Compares Truckload Freight rates against

10   predetermined Freight Per Mile benchmarks at a Case Freight level.

Figure **211** is a flowchart of a process **21100** for product routing in a supply chain management framework in accordance with an embodiment of the present invention. A plurality of lanes of a supply chain are identified in operation **21102**. Next, a lowest cost

15   routing scheme is determined for each of the lanes in operation **21104**. A supply chain analysis is then performed using the lowest cost routing scheme in operation **21106**.

In one aspect of the present invention, the lowest cost routing scheme may be selected from a group of schemes that includes less-than-truckload carriers (LTL), regional

20   distribution centers (RDC), and full truckloads (FL). In another aspect, the lowest cost routing scheme may be determined automatically prior to performing the supply chain analysis. In a further aspect, a report reflecting the supply chain analysis may also be outputted. In an additional aspect, the lanes may be identified utilizing a network. In yet another aspect, results of the supply chain analysis may be outputted utilizing a browser-

25   based interface.

Solving and Reviewing the Solution

Once all the required information has been entered, the problem can be solved from any

30   of the tabs by selecting the Solve button **21200**, shown in Figure **212**. The processing

time will vary depending on the complexity of the problem and the quantity of the data that is being passed to the solver.

It will pass through the following phases:

- Solver Validation: Incomplete analysis data can be saved, but it is not valid to pass that information to the solver. For example, an analysis can be saved without filling in all the pricing, the solver cannot run until it is complete.

- Feasibility Check: A preliminary check is run to ensure that the problem definition attempted to be solved is feasible. Infeasible scenarios would include, say, a lane requirement with no relevant freight quote, or Supplier minimums greater then the sum of the Supplier's FOB maximums. A list of exemplary checks are as follows.

  o Sum of FOB max < Supplier min
  o Sum of FOB min > Supplier max
  o DC has Usage but no Freight (e.g. no Freight quote or all Lanes Excluded)
  o Total Usage > Total Supplier max
  o Total Usage > Total FOB max
  o Required Lanes, No Freight
  o Required Lanes, insufficient Supplier capacity
  o Required Lanes, insufficient FOB capacity
  o Valid Lanes, insufficient Usage for Supplier min capacity
  o Valid Lanes, insufficient Usage for FOB min capacity
  o DC Usage > Any FOB max
  o Lane without facility

- 'Optimal Product Routing: First, a determination is made as to whether there is a need to run OPR or not, and if there is the process will run.

- Weighted Delivered: The weighted average delivered cost for the basket of products for each lane is calculated. If applicable the optimal freight is included from the OPR process.

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- Check Solver Availability: Whether licensing allows one or more concurrent

  users

- Run the Solver: Invoke the solver engine

- Insert Results: Grab the results from the solver and update the Supply

5   System.

Figure **213** illustrates the Report Selection window **21300** which allows selection of the

report type. The Report Type menu d7402 lists associated reports.

10   The report generator for the least cost system operates in the same manner as the report

generator in the 'Utilities' menu of the Supply System.

The Least Cost system has several reports available to analyze and view the solution

generated by the solver. These reports fall under the following categories.

15

- Awarded Volume: Awarded Volume reports are used to show each FOB/DC

  combination and it's awarded volumes. These reports can be used for specific

  items or the market basket. Figure **214** illustrates a Report Name drop down list

  21400 of related reports.

20   o   Awarded Volume by Item – Detail   Solver solution with a

          breakout of each lane awarded, the Invoice FOB (and relevant contract

          FOB), freight and estimated sales.

          o   Awarded Volume by Item – Freight   Solver solution with a

          breakout of the freight costs on each lane, as well as the period and

25   annualized freight totals.

          o   Awarded Volume by Item – Summary   Solver solution with

          Supplier and FOB summary totals only.

          o   Competing DC Freight Analysis by Item   A freight analysis between a

          series of pre-defined "competitive" DCs based on the latest finalized Cost

30   Matrix and the selected version.

- o Lane Assignment Matrix   A lane assignment grid to quickly review the solver solution, FOB capacity constraints and the Contract FOB used.
- o Lane Weighted Average Delivered Cost   A complete lane grid detailing the delivered costs on each lane. For FOBs with volume pricing, the delivered costs are based on the awarded volume to each FOB point.

- • Comparison Reports: The comparison reports enable a user to compare different versions of an analysis against each other or against the latest finalized cost matrix by item. Figure **215** illustrates a Report Name drop down list **21500** listing related reports.
  - o Assigned Volume Percentages .   A FOB comparison of awards and award percentages of overall volume.
  - o Invoice FOB Detail Comparison   A DC comparison of invoice price, freight, delivered costs and routing. It also shows weighted average and summary totals.
  - o Invoice FOB Savings Comparison   An overall comparison of invoice price, weighted average freight and delivered costs and summary totals. When compared with a Cost Matrix it will calculate the savings estimate between the matrix and the versions selected.

- • Cost Matrix Preview: The cost matrix preview report enables the user to preview the cost matrix that would be created from the selected analysis version, before it is actually created in the Supply System. Running this report will show the user all of the DC/FOB combinations and the costs associated with them. The user can also preview the cost matrices from the "Cost" toolbar option.
- • Optimal Product Routing: OPR reports are used to view the results of the OPR processing. Here the user can check information entered and also the information that OPR has generated. Reports include an OPR by item and OPR by lane report. For a full explanation of the OPR reports, see the earlier section entitled Optimal Product Routing.

- Tab Reports: The tab reports will generate reports designed for specific tabs. Here the user can also generate a report for each tab within the least cost analysis. Use this option to view a report of all information for an analysis.

5   Note that data on individual tabs can be printed using the print option on the toolbar for that specific tab.

The present invention also allows a user to retrieve Comparison Reports. The example below will retrieve the 'Invoice FOB Comparison Report (no conversion)'. Note that the

10   term "conversion" refers to whether the report should show the price information in the analysis units (ex: pounds, pours) or convert the price information to cases. If the analysis was performed in cases, then with and without conversion will be the same.

First, the 'Comparison Reports' report type is selected from the Report Type drop down

15   list. After selecting the Comparison Reports report type the Report Name should appear as shown in the Report Selection window **21000** of Figure **216**. Next, the report is selected from the Report name drop down. In this example, 'Invoice FOB Detail Comparison (no conversion)' is selected from the report name drop down list **21700**. See Figure **217**.

20

Upon selection of the report name, the appropriate parameter entry fields **21800**, shown in Figure **218**, are enabled in the lower portion of the screen. As shown in Figure **218**, this report allows selection of an item, multiple versions of the current analysis (using CTRL+Click), and whether to include the latest finalized cost matrix for the current item

25   in the comparison.

In the example above, for HASH BROWNS, the solution for two versions and the latest finalized cost matrix will be compared.

30   After the correct parameters have been chosen, the report can be prepared for output to the user. Clicking on the 'Retrieve' button **21900** on the toolbar will retrieve this report

and open a window so the user can view or print the data. A Retrieve button is shown in Figure **219**.

The process is the same for any report a user wishes to view. The only difference is the
5   parameters that can be selected.

Figure **220** is a flowchart of a process **22000** for comparison reporting in a supply chain management framework in accordance with an embodiment of the present invention. A plurality of supply chain analyses are selected in operation **22002**. Results of the selected
10   supply chain analyses are located in operation **22004**. The results of the supply chain analyses are then compared in operation **22006** and a report on the comparison is generated in operation **22008**.

In one aspect, each of the supply chain analyses may include a separate version of a
15   single supply chain analysis. In another aspect, the results may include cost information. In a further aspect, the supply chain analyses may be selected utilizing a network. In such an aspect, the supply chain analyses may be selected utilizing TCP/IP protocol.

Creating the Cost Matrices
20

Since the solver input, routing and solutions are already stored in the system, to generate cost matrices, the user simply has to identify the version from which he or she wishes to create the matrices and select the Cost button **22100** on the toolbar. Figure **221** illustrates a Cost button.
25

Figure **222** is a depiction of a Cost Matrix Creation window **22200** displayed upon selection of the Cost button. The present invention provides two options at this point: the matrices can be created, or a preview of them can be generated and output before creation.
30

302

- Preview button: allows the user to preview the exact information that will be inserted if a decision is made to create the matrices.
- Create Cost button: creates all Cost matrices based on the solution for the current version.

5

If the system detects any matrices in the system which cause a conflict, a list of those matrices is output. Preferably, the user can only overwrite an existing matrix if the dates are the same as in the analysis and the existing matrix has not been finalized. The matrix that is created by the least cost system can be edited as normal and is created un-

10   finalized.

The present invention automatically generates both inbound and outbound RDC lanes to ProSource and Chicago Consolidated when the user inputs a command to create or preview the cost matrices.

15

In a preferred embodiment, the solver is designed to restrict each RDC to have only one FOB point. Hence the cost matrix will generate one inbound lane to either RDC and automatically populate the outbound lanes with the relevant Contract and Invoice FOB based on the landed cost to the RDC plus markup and the relevant outbound freight.

20

If volume pricing is used, the sum of the awards across all RDC lanes that the solver selects can be used to determine the relevant price.

Usage Estimator

25

The Bid Proposal and Least Cost systems both have a Usage Estimator module which provides a sophisticated mechanism for projecting product case usage by DC for a particular period. The Usage Estimator takes into account for each DC the following:

30   • Projected Average Restaurant Count
      • Previous Usage (Average Units sold per Restaurant)

- Product Growth
- Coverage Factor

The Usage Estimator is made up of two pieces, DC/Restaurant Information (DC/Rest) and Usage information (Usage). In order to determine the projected product case usage, the system must first calculate the Projected Average Restaurant Count, so the DC/Restaurant portion of the Usage Estimator will be discussed first.

Regarding the DC/Restaurant Information, a Current Restaurant Count is provided monthly by the DC's in the form of Distributor Reported Landed Cost. This information, verified by Finance for Patronage Dividend purposes, provides an accurate monthly snapshot of Restaurant counts by DC. The Usage Estimator uses the most current month of information available for each DC.

Also provided with the DC/Restaurant Information is a Restaurant Growth Percent (Average) report which specifies the overall average increase/decrease in restaurant coverage that each DC will experience for the length of the Contract Period in question. Consider the following example: A DC currently services 100 Restaurants. At the end of the 1-year pricing, the DC will be servicing 110 Restaurants. The *Projected Average Restaurant Count* would be (110-100) / 2 = 105. The *Restaurant Growth Percent* in this case is (105-100) / 100, or 5%.

The Usage Information provided includes Previous Case Usage. This includes the actual number of cases sold by this DC during the previous period. Each month, the Supply Chain Coordinator receives Product Sales statistics from each of the DC's. This information contains case sales of each Distributor's Item, along with the number of Restaurants that product was sold to during the month. The Previous Case Usage number itself is not used directly to calculate Projected Usage, as it would not allow manipulation of DC Served information. This information is available under Sales/Inv - Distributor Sales from within the Supply System.

Previous Period usage information is determined by the latest information available from the DC's. For example, assume that on December 1, a Bid for a Contract Period from January to June will be completed. At this point, the system would have probably only received complete DC information through October. Since the Contract Period is 6

5   months, the *Previous Case Usage* would report usage for the latest 6-month period of DC Sales information (May thru October). This is considered the *Previous Period.*

The Average Units sold per Restaurant Month includes the average number of cases per month of product sold by a DC to the Restaurants it services, for those restaurants that

10   receive product during the month. Remember, not all Restaurants will receive each product during each month. This figure, unlike the *Previous Period* information, is based on the latest complete 12-month rolling average of DC Sales information.

A Projected Average Restaurant Count is calculated by multiplying the *Current Restaurant*

15   *Count* by the *Average Restaurant Growth Percent*. This number is manipulated on the DC/Rest tab.

A Product Growth Percent can also be calculated. The Usage Estimator allows the user to effect Projected Usage via a *Product Growth Percent*. For example, BKC may estimate a

20   5% jump in sales for a particular product during the length of the Contract Period due to national promotions, product mix changes, etc.

The Usage Estimator takes into account the fact that a particular Item is not necessarily sold to all Restaurants that a DC services. Some items are purchaser's options, others

25   such as sausage patties, come in different sizes. Even an Item such as the Whopper will not be sold to 100% of a DC's Restaurants each month due to mid-month store openings and closings. Coverage Factor is calculated by dividing the number of Restaurants a Product was sold to by Restaurant Count during that Period. For example, if a DC Services 100 Restaurants during a month and sold SAUSAGE 1.5 PATTIES to 50 of

30   them, this Item would have a Coverage Factor of 50/100 or 50%. Because of the

difficulty of collecting each Invoice a Restaurant receives, the DC's provide a monthly

report of the number of cases sold and the number of Restaurants the product was sold to.

To illustrate, consider the following:

5

Table 32

Restaurants Served			Product Sales Per Restaurant					Coverage
A	B	C	D	E	F	G	H	I
Current Rest Count	Rest Growth (Average)	Proj. Avg Rest Count (A * B)	Avg Units Per Month	Product Growth	Proj Avg Units/Month	Number of Months	Proj. Units Per Rest (F * G)	Coverage Factor
100	10%	110	150	10%	165	12	1,980	95%

Projected Usage (C * H * I)
206,910

Remember, Projected Usage is comprised of the following:

10
- Projected Average Restaurant Count
- Projected Average Units

   (Previous Usage [Average Units sold per Restaurant] * Product Growth)
- Coverage Factor

15   Realize that zero growth will still give a higher Projected Usage. It's important to

remember that the Previous usage is based on a changing Restaurant base. For example,

assume that a DC last year started with 100 Restaurants and ended up with 110, and that

the Average Units Per Month was 10. This DC would have sold an average of 1050 units

per month (the Average Restaurant Count is 105). Notice that even if no Restaurant or

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Sales growth occurs the next year, the Projected Usage will be higher than 1050, because of the fact that there are 110 Restaurants at the start (110 * 10 = 1100).

The process of estimating usage is user-friendly, providing DC level information, with user-input adjustments for Restaurant and Product Growth.

Landed Cost / Restaurant Count information includes:
- Case Sales by Distributor / DC
- Landed Cost by Distributor / DC
- Restaurant Counts by Distributor / DC
- Product Counts by Distributor / DC
- Average Landed Cost Per Case
- Average Cases Per Restaurant
- Average Landed Cost Per Restaurant
- Sales reported for Items not in the Product File
- Inventory reported for Items not in the Product File
- Percentage Growth by DC - Product Sales
- Percentage Growth by DC - Landed Cost
- Percentage Growth by DC - Restaurant Base
- Percentage Growth - Product Count
- Percentage Growth by DC - Product Count

Each Distributor references a system Item by it's own Distributor Item and Distributor Item Description. For example, a Whopper can be referred to as "BEEF-WHOPPER 4.0 OZ", while another company calls it "WHOPPER", and a third company calls it "WHOPPER CS/144EA". Cross-referencing, or matching system items with each of the Distributors', is what allows a user to view inventory or sales for the Whopper without knowing the Distributor's naming conventions.

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In some cases, a Distributor may have more than one Item (SKU) for a particular system Item. A slight packaging change may cause the Distributor to create 2 SKU's for what could otherwise be considered one system Item.

5   For example, a DC that services 100 Restaurants changes SKU's mid-month and reports selling 1000 cases of the first SKU to half of its Restaurants, and 1000 cases of the second SKU to the other half. *Average Units sold per Restaurant Month* in this case, would be the number of Items sold (2000) divided by the *Restaurant Count* (100), or 20.

10   A Distributor may not always change an SKU. They may consider CUP-PROMO a catch all even though there is a separate Item for each CUP promotion.

Each time the Usage Estimator is used, the following should be verified:
- Appropriate DC's are accounted for in Previous Case Usage
15
- DC Items appear to be properly Cross-Referenced
- Reasonableness of DC Sales Monthly Detail information for this Item (Sales/Inv - Direct to Restaurant)
- Previous Case Usage and Average Units sold per Restaurant are reasonable and consistent
20
- DC Sales information coincides with Supplier Sales for the Item (taking timing and DC inventory into account).

Beef Formula Pricing System Example

25   The Formula Pricing System of the present invention allows quick and easy calculation of the weekly meat block cost for all suppliers.

A new Formula Pricing can be created in either of two ways. The first one is to build a Formula Pricing from scratch. The second method uses the "New Using Previous"
30   feature, which will create an entire copy of a previous Formula Pricing and allow a user to make the necessary modifications.

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Figure **223** illustrates the Formula Pricing submenu **22300** of the Supply drop down menu. To create a new Formula Pricing, select Edit / View to open an existing Formula Pricing or create a new one. After selecting the Edit / View menu option, the standard

5   query screen is displayed. Select New.

To use the New Using Previous feature, select New (Using Previous) from the Formula Pricing submenu to copy an existing Formula Pricing into a new one. A complete copy of a previous Formula Pricing can be made by selecting this option.

10

Figure **224** illustrates a Formula Pricing window **22400**. As shown in Figure **224**, the Formula Pricing window is made up of several different tabs. The labels identify these tabs across the top of the window. Examples of these tabs are 'Pricing', 'Formulas' and 'Block Cost'.

15

The first tab visible on the Formula Pricing window when it is opened is the 'General Info' tab, which shows pricing description, item, date ranges and Adjustment amount. This tab is where general information for this Formula Pricing is entered. The fields of the General Info page include:

20

- Pricing ID: Unique identifier for this Pricing. Generated by the Supply System. Non editable.
- Description: Unique name for this Pricing. It should representative of the type of Formula Pricing being completed, and will be the primary method of identifying and

25   retrieving the Pricing later.

- Item: Item whose Price is being calculated. After the Pricing information is saved this field is grayed out, becoming non-editable.
- Raw Material Pricing Date: The Coordinator/Supply System calculates this date but it may be changed. The system will pick up the last Monday used for the chosen item

30   and calculate the next Monday. After entering this date or accepting the system generated one, the Formula Pricing date range is calculated as follows: The To Date is

calculated subtracting 3 days from Raw Material Pricing Date (Monday) which will give a Friday. Then 11 days are subtracted from this date to calculate the From date (Friday). This date calculation may be changed by the IS Development staff.

- Cost Matrix Begin Date (and End Date): Cost Matrix Date period associated to this item Formula Pricing.

- FOB Adjustment Amount: Upcharge or downcharge applied to formula calculation.

Figure **225** depicts the page **22500** displayed upon selecting the Pricing Tab. After entering all of the information on 'General Info' tab, the user will be now be able to move to the next tab 'Pricing'. This tab is used to enter the prices of the raw materials for the Formula Pricing period.

The Date column includes the period dates excluding weekends. These dates can be modified. If the date exist in a previous pricing, the message window **22600** shown in Figure **226** will pop up. If the user answers yes, the prices for that date will be inserted into the current Formula Pricing.

If there are more than one pricing with the same date, the message window **22700** shown in Figure **227** will appear. If the user answers yes, a selection window **22800**, depicted in Figure **228**, will appear to allow selection of the pricing data that the user wants to copy over the current pricing.

Some of the raw materials price is calculated based on other materials. The following is an illustrative list of these materials with their formulas.

Fresh Domestic 73% Trim:
(Fresh Domestic 75% Trim / 75) x 73

Fresh Domestic 80% Lean:
(Fresh Domestic 85% Trim / 85) x 80

Fresh Domestic 90% Lean:

(Fresh Domestic 90% Lean Blue + Fresh Domestic 90% Lean Yellow) / 2

Lean Finely Textured Beef:

(Fresh Domestic 90% Lean x 0.80 (or 0.82))

Figure **229** is an illustration of the page **22900** displayed upon selection of the Freight Tab. The Freight tab shows the freight amount that will be added to raw material per Supplier FOB. Preferably, the Freight tab is display only.

Figure **230** is a depiction of the page **23000** displayed upon selection of the Formulas Tab. This tab is also display only and it will show the different formula values for each supplier. The columns of the Formulas Tab page include:

- **Formula:** Generic name of the formula, which include an acronym for the supplier's name and a number.
- **Pct.:** Percentage of raw material used in the formula.
- **Cost:** Cost of raw material based on percentage (Price + Freight).
- **Total:** Sum of all the costs in formula.

Formula Descriptions:

The following Table describes illustrative formulas. The freight amount, if any, is added to each raw material average market quote.

Table 33

Company A Food Service:

Raw Material	Percentage
Fresh Domestic 50% Trim	31.200%
Fresh Domestic 90% Lean	18.800%
Imported Australian 90% Lean	40.000%

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Lean Finely Textured Beef   10.000%

Figure **231** illustrates the page **23100** displayed upon selection of the Block Cost Tab. The Block Cost tab creates the FOB price based on the previous tab calculations and the

5   yield and margin. The columns displayed include:

- **Formula:** Formula short name (supplier).
- **Raw Material Cost:** Total amount from previous tab.
- **Yield:** Processing yield (inverse shrinkage). For example on AFS-1 there is a 0.01

10   loss of material.

- **Block Cost:** Calculated field. Raw Material Cost / Yield.
- **Margin:** Supplier's markup.
- **FOB Price:** Sum of Block Cost and Margin.
- **Include?**: Specifies if the formula price will be used.

15

Figure **232** is a depiction of the page **23200** displayed upon selection of the Adjustments Tab. The final FOB Price may be modified using the Adjustments tab. The toolbar icons **23300, 23302** shown in Figure **233** are used to insert or delete adjustments.

20   After the Formula Pricing is completed the user can print the Raw Material Letter which describes the prices of the raw materials for the different suppliers of the current Formula Pricing. To retrieve the Raw Material Letter, the RM Letter icon **23400** is selected. See Figure **234**.

25   Figure **235** illustrates the Formula Maintenance window **23500** that is used to modify or add new formulas. To open the Formula Maintenance window, the Formula Maintenance menu item **23600** is selected from the Formula Pricing submenu, as shown in Figure **236**.

The top portion of this window shows the formula's main information, including:

30

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- **Formula ID:** Unique identifier for each formula. Generated by the Supply System. Non editable.
- **Facility:** FOB for each formula.
- **Description:** Formula's unique name.
- **Short Name:** Unique code for each formula. Used as a label in Formula Pricing main window.
- The bottom portion of the window displays detailed information of the selected formula from the top.
- **Material Type:** Raw materials used in the selected formula.
- **Begin Date:** Starting date of formula percentage.
- **Percentage:** Amount of raw material used to create a finished item. The sum of the percentage must total 100.

In Summary

The new technological infrastructure and its associated electronic reporting and feedback systems equips retailer management with accurate, timely, and previously unavailable information from the Supply Chain on sales, marketing and other performance indicators allow Supply Chain management to fully engage in managing supply and distribution processes and channels toward identified and agreed strategic objectives provide franchisees and retailers with the Supply Chain information they need to operate efficiently and make effective management decisions minimally impacts the resources of Supply Chain management

With Supply Chain management assuming full responsibility for managing the fundamentals of the Supply Chain system, Supply Chain participants are strategically positioned to focus on the six business priorities that have been identified: operational excellence, boosting sales growth, focusing resources, discovering the essence of the Brand, image transformation and revitalizing franchisee relations.

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While various embodiments have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of a preferred embodiment should not be limited by any of the above described exemplary embodiments, but should be defined only in accordance with the following

5   claims and their equivalents.